

# AGRICULTURAL CHEMICALS

## *In This Issue:*

Agricultural Streptomycin

NFA Meets in Hollywood

Sprayers & Dusters Convene

CACA Elects Anderson

N. J. 1955 Recommendations

Agronomists—Soil Society  
Hold Joint Meeting

Decker Heads ESA

Chelates in Plant Nutrition





### Our Hope . . . .

. . . that every year more and more of the sparkle and glitter of Christmas will come from the GOLDEN RULE. For, while it contains no carets, inches or feet, it is the standard measurement for all mankind.

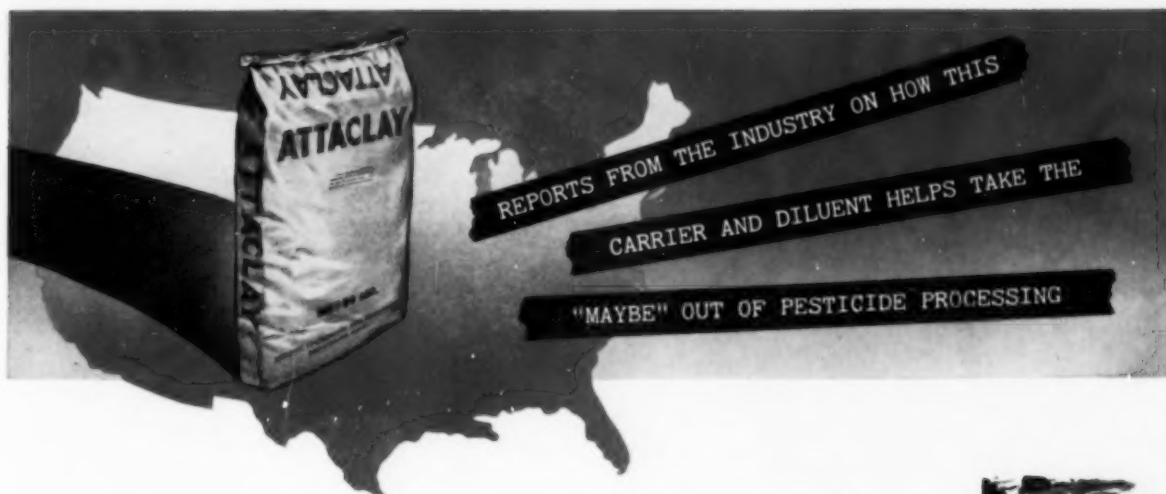
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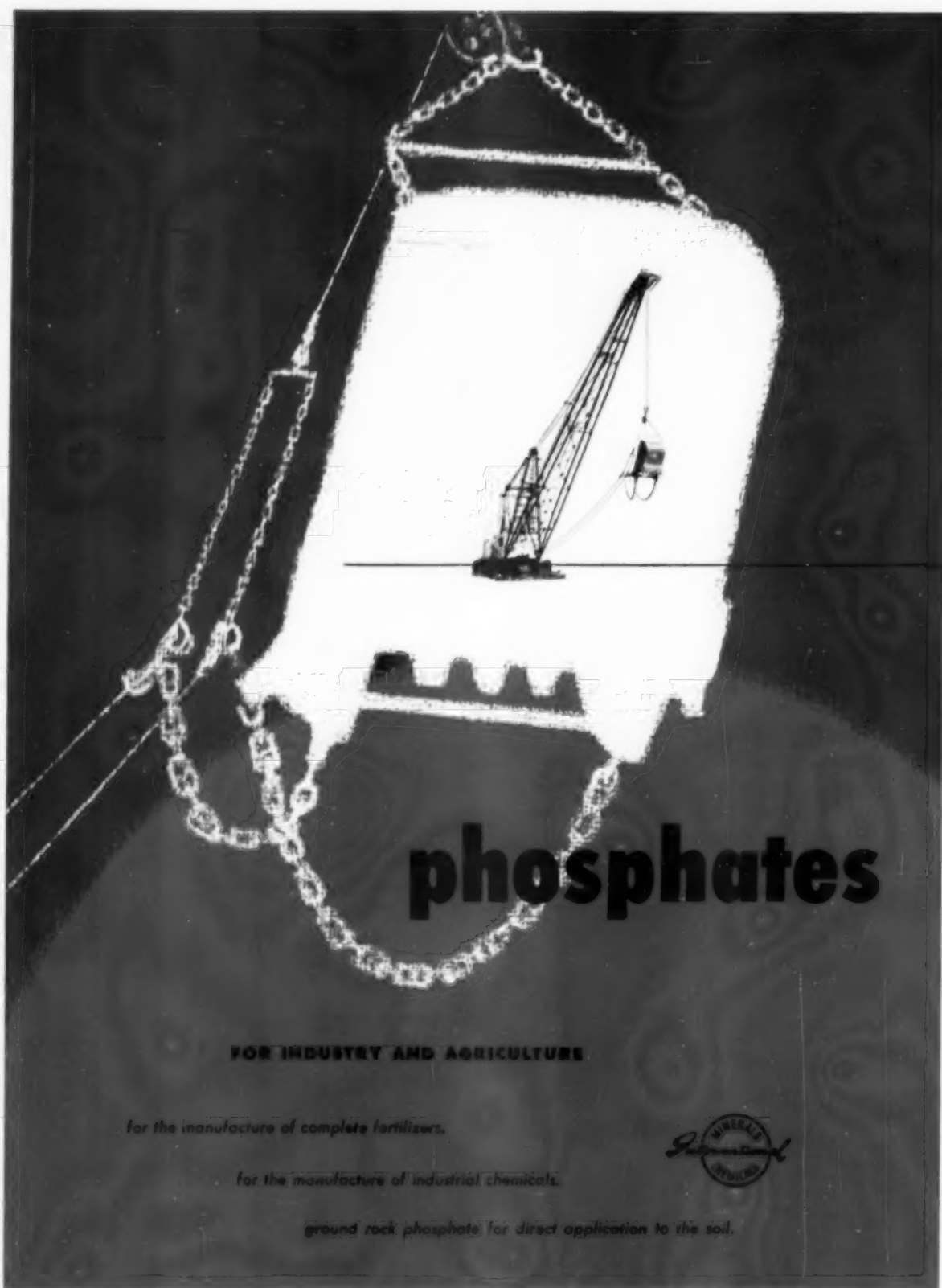
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Minerals & Chemicals Corporation of America

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# AGRICULTURAL CHEMICALS



**A Monthly Magazine  
For the Trade**

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## This Month's Cover

George C. Decker, newly elected president of the Entomological Society of America, which held its annual meeting in Houston Texas, December 6-9.

DECEMBER  
Vol. 9

1954  
No. 12

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## AGRICULTURAL CHEMICALS

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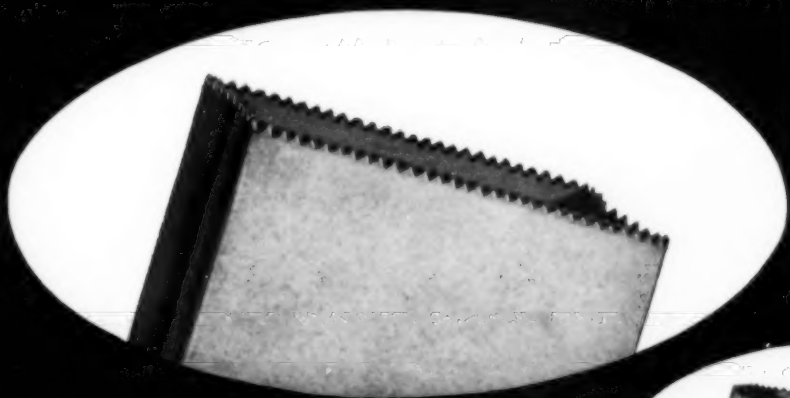
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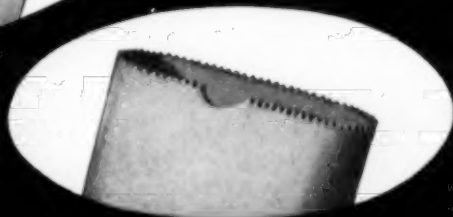
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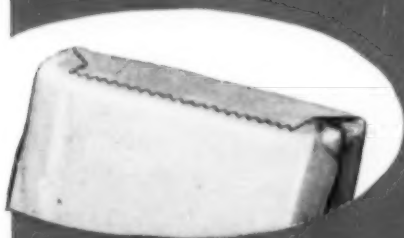
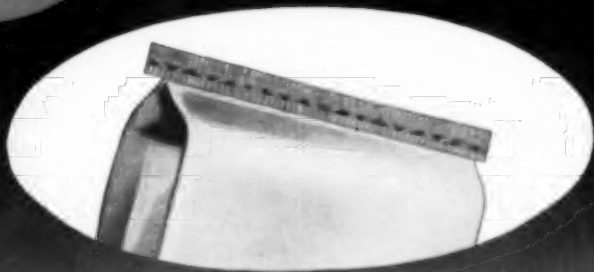




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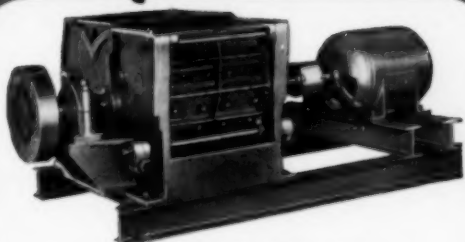
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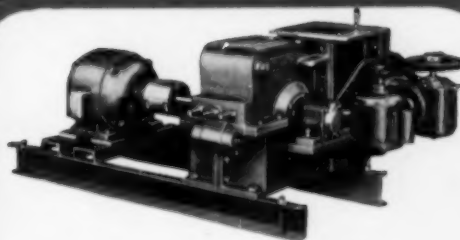


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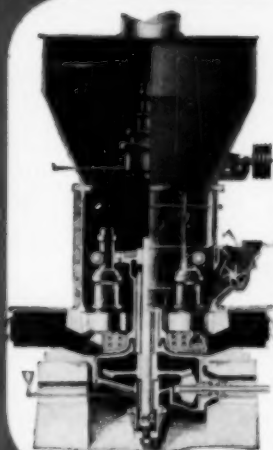
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# WILLIAMS



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For cleaner, safer dustless grinding of dry materials—or non-clogging, accurate grinding of wet, sticky or greasy materials—to finenesses of 100 to 325 mesh. Combines the advantages of a hammer mill with closed-circuit screw-type feed. No separators, fans or cyclones required. Available with steam or water jackets. Low investment—inexpensive to install and operate.



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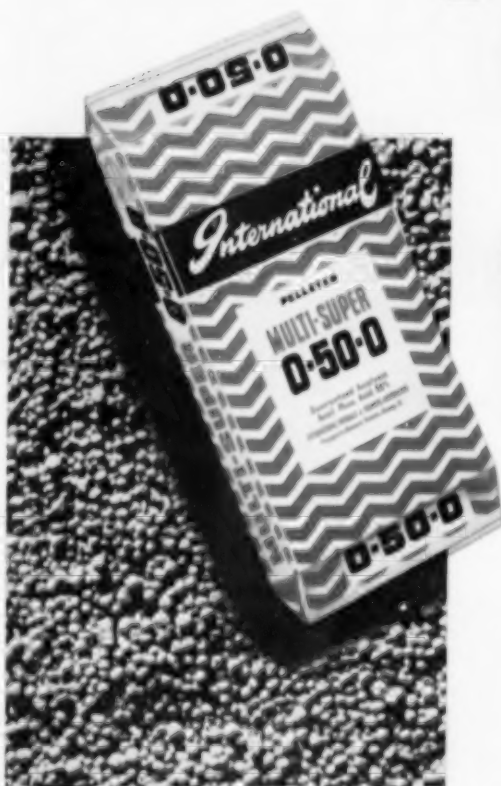
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# Announcing **two** new, special-phosphate fertilizer

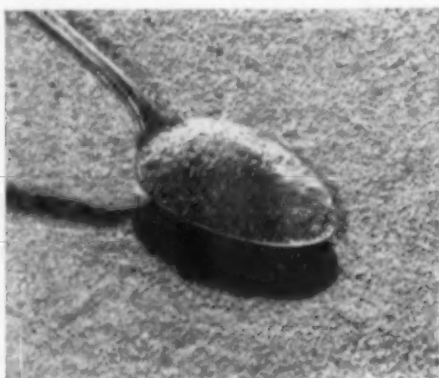


Multi-Super Pellets, shown actual size

## **1** For direct application **0-50-0 Multi-Super Pellets**

Here's a unique high-potency, high-quality phosphate — "pelleted" to meet special on-the-farm needs today. New Multi-Super is free flowing. Its exclusive BB-sized granules won't bridge or clog spreading equipment. Multi-Super is acid free, too. Doesn't react with bag linings. Retains full strength in storage. Saves 8-10% in freight, storage and handling costs.

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Fine texture eliminates grinding before mixing; ammoniates readily

## **2** For mixing and ammoniation **Triple Superphosphate**

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*Phosphate Chemicals Division*

**AGRICULTURAL CHEMICALS**

# purpose products

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Note freedom from bridging  
and clogging.



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**Lion Sulphate of Ammonia** — For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

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*Engineered*

### to meet modern PRODUCTION REQUIREMENTS

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Coupled with a complete line of equipment is Union Special's vast background of experience and technical know-how that insures customers of getting THE RIGHT MACHINE FOR THE JOB!

Union Special representatives located in all leading industrial centers are qualified by experience and training to give you expert recommendations. Take advantage of the service they offer.

Ask for recommendations. UNION SPECIAL MACHINE CO., 447 North Franklin St., Chicago 10, Illinois.

Send for  
Bulletin 200



*Union Special*

### BAG CLOSING MACHINES

MORE PRODUCTION WITH LESS EFFORT!



**CLASS 21800** (left) for fast, economical closing of paper bags. Illustrated is Style 21800 H with 5 ft. conveyor and 80600 H sewing head for making tape bound closures. Tape is cut off automatically at each end of closure. Sewing head and conveyor adjustable vertically.

**CLASS 20500** (above) machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.

**STYLE 20100 H** (left), is a heavy duty, high production calumet type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.

**DUPLEX MACHINES** (right) are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must—operator can instantly switch to other head.

*Seasons Greetings*

&

Best Wishes For  
A  
**PROSPEROUS  
NEW YEAR**

---



**NATIONAL AGRICULTURAL  
CHEMICALS ASSOCIATION**

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★ SOLVENT

★ TOXICANT

★ DISPERSION

★ METHOD OF EVALUATION

★ % TOXICANT IN CONCENTRATE

★ WATER HARDNESS

★ SHELF LIFE

★ DILUTION

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for all  
requirements  
of your  
concentrate



there's a  
matched

**ATLOX**<sup>®</sup>  
emulsifier

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Atlas representatives can help you in this selection—if they know all your requirements. Backed by a staff of specialists with long experience in the field of agricultural chemistry, and an extremely capable group of research chemists, they are ready to assist you. They can recommend Atlox emulsifiers, or emulsifier blends, which will enable you to give your customer what he wants, and bring him back to you for his future needs.

Just send us complete information about your concentrate, and we'll be glad to recommend an Atlox emulsifier that's tailor-made for your formula.



CHEMICALS DEPARTMENT

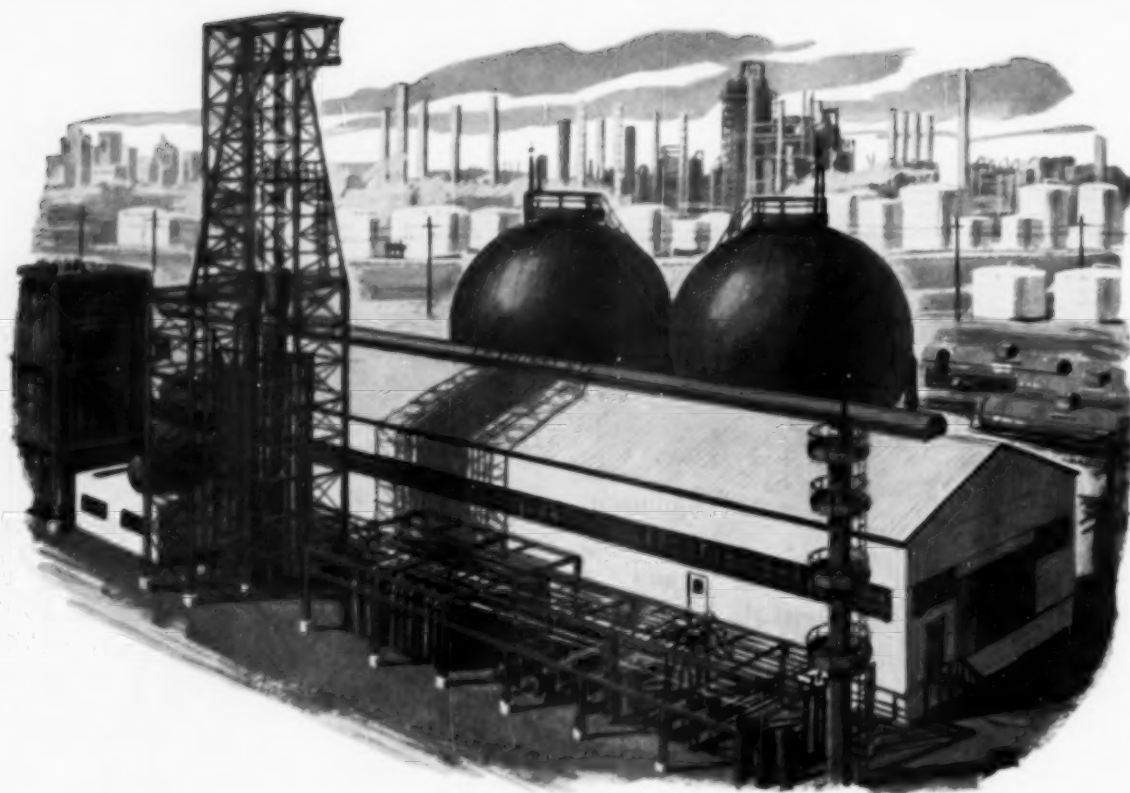
**ATLAS**

POWDER COMPANY

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ATLAS POWDER COMPANY,  
CANADA, LTD.  
BRANTFORD, CANADA



## New Anhydrous Ammonia Plant

**Atlantic puts first plant of its type in operation  
in growing Delaware Valley area**

Atlantic has now put into production its new anhydrous ammonia plant. New in conception, it uses high-purity hydrogen from the refinery catalytic reformer. Output from this unit will be available for chemical and agricultural use . . . ranging from the manufacture of synthetic fibers to fertilizers.

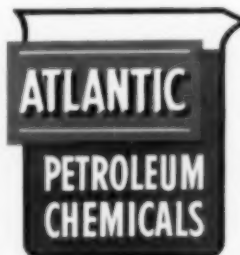
This new unit is one more step in Atlantic's modernization program designed to meet the expanded needs of industry for petrochemicals. For detailed information on the constantly growing family of Atlantic petrochemicals, write to any of The Atlantic Refining Company offices listed below or use the coupon.

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Please send information on Atlantic petrochemicals. We manufacture such products as

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Company \_\_\_\_\_  
Address \_\_\_\_\_



Philadelphia,  
Providence, Charlotte, Chicago

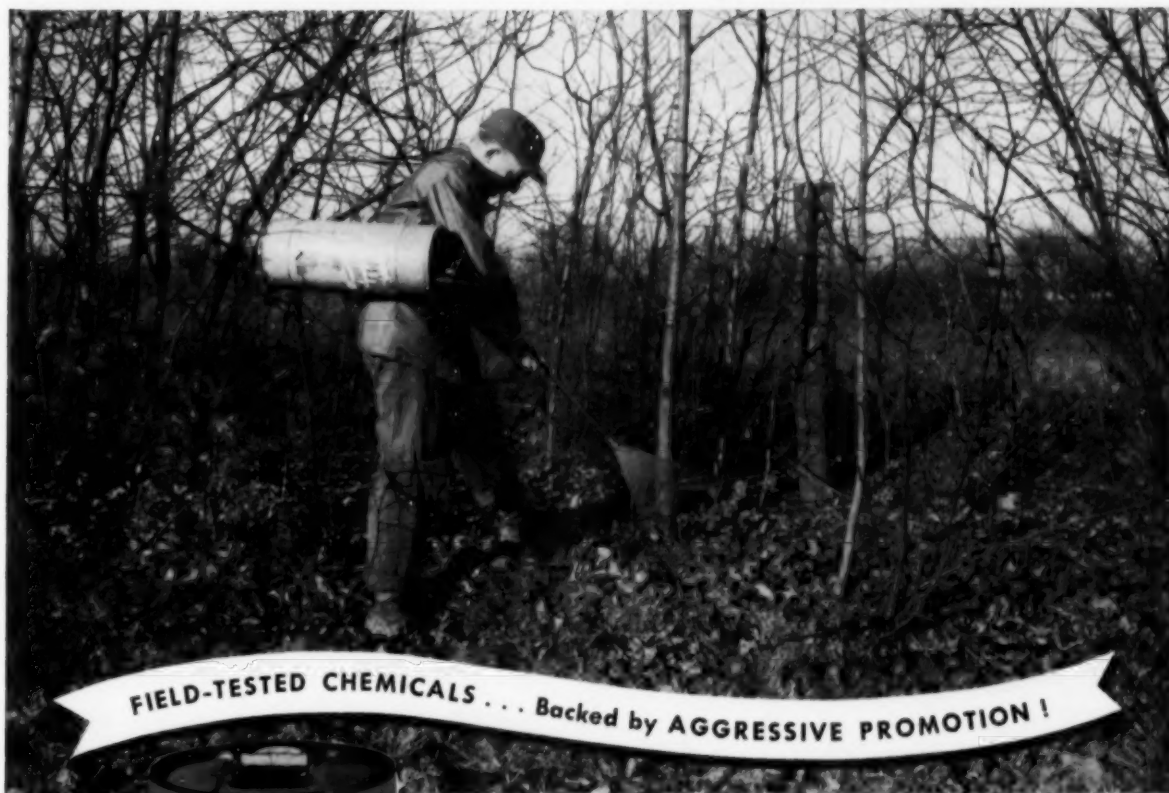
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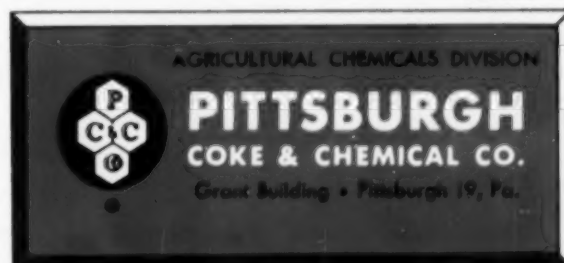
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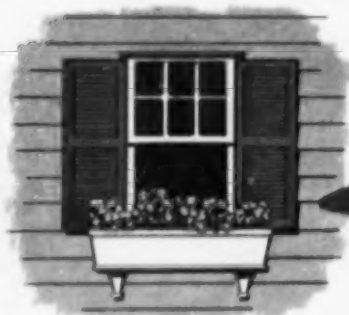
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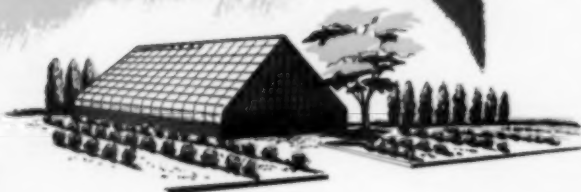
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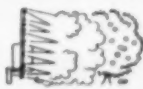
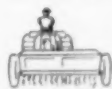
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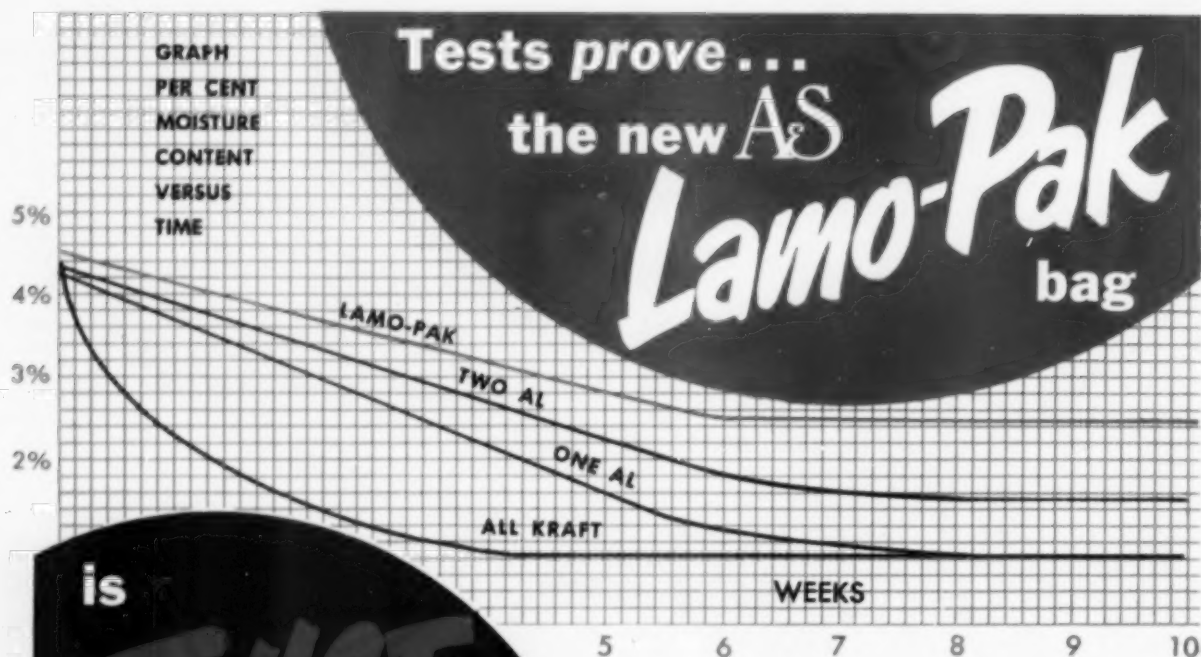
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## Editorial COMMENTS

**A**S the time approaches when briefs must be filed to note any disagreement with the schedule of tolerances proposed October 20th by the Food and Drug Administration, or with the regulations offered to implement the Miller Pesticide Residue Amendment, it seems to be rather evident that no strong disagreement with either proposal is to be anticipated from the pesticide industry. Representatives of industry have conferred with FDA officials on various aspects and wording of these two proposed regulations. The conferences were held in an atmosphere of understanding and cooperation and there seems to be a general feeling that the various points at issue can be resolved satisfactorily. While it is still possible that briefs may be filed by interested parties on December 20th, it seems at this time unlikely that there will be sufficient objection to either proposal to call for further public hearings.

If a company finds the proposals acceptable, there is no further action required at this time. The next important calendar date will then be next July, when the Miller Amendment will automatically go into effect, unless, as is always possible, there is a government decision to postpone the effective date of the measure.

On new materials, however, and on materials where new data has been developed since the original FDA hearing in 1950, it is not too soon to start getting data lined up so that these products can be certified or re-certified for use as useful pesticides under the terms of the Miller Amendment. One fact should be kept firmly in mind, and that is that when the Miller Amendment becomes law,—July or later—there will automatically be a zero tolerance for any product on which no definite tolerance has been set.

Next July is not too far off,—and there is a tremendous lot of work to be done in preparing the background for your case, submitting it in proper form and waiting to have it acted upon. Particularly if you have any feeling that there may be matters to get straightened out along the way, before your tolerances can be set, don't wait too long to get started with the paper work!

**T**EST work currently being conducted at several state experiment stations on fall applications of fertilizer seems to offer good prospect for the future of leveling out some of the peaks and valleys in fertilizer production and sales,—leading to more efficient operation by the fertilizer industry, lowered cost of fertilizer production and reduced prices for the farmer. Reports given at the recent meeting of the American Society of Agronomy in Minneapolis (See pgs. 48-49) indicate that the fall applications are just about as efficient as the conventional spring applications in promoting crop yield.

If further test work bears out these preliminary findings, and if the fertilizer industry is then prepared to finance and carry through to a successful conclusion the long program of farmer re-education which will be necessary to sell the idea of buying and using fertilizers on a year-round basis, it could be a great thing for every one connected with fertilizer manufacture and use. It is obviously more efficient and economical to manufacture, ship and stock fertilizer on a year-round basis. Substituting steady employment for the present seasonal basis, the industry could attract and keep a higher type work force. Costs could be reduced all along the line, and fertilizer manufacturers could

*(Continued on Page 106)*



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AGRICULTURAL CHEMICALS

# WHY NOT SELL ENTOMOLOGY?

By George C. Decker

Illinois Natural History Survey  
Urbana, Illinois



IT is perhaps safe to say that the American public is less than fifty per cent efficient in the use of currently available insect control "knowhow." The members of the entomological profession and those engaged in the manufacture and sale of insecticides or equipment for their application are keenly aware of the magnitude and importance of our insect problems, but what does the word "entomology" mean to the average citizen? As Dr. David G. Hall pointed out a couple of years back, if you were to conduct your own "Man On The Street" program and ask fifty passing individuals "What is entomology?," nine out of ten of them would give you no more than a vacant stare. In an agricultural community the response would be much better, but even there we find far too many individuals who do not have an adequate knowledge of insects, their habits, or suitable measures for their control.

Theories may be advanced, or laboratory experiments and small field tests may prove that insects can be controlled, but until it is also clearly demonstrated that these same insects can be effectively and profitably controlled in their natural habitat, many housewives, home owners, industrialists, and farmers will with considerable

justification maintain a "do-nothing" attitude.

In recent years, research has proved to the satisfaction of thousands that the control of insects on many field crops is economically just as sound as the well established practices commonly used for the control of insects on orchard, truck and other high-value crops. Nevertheless, it is equally true that there are many farmers who have not as yet tried these recently recommended insect control practices, and who still are not convinced they could make or save money by doing so. Now as never before the entomological profession is confronted with the urgent necessity of developing a more aggressive educational program. We all recognize the good work being done by the state and federal agricultural services and we have Secretary Benson's word that he will do all that is within his power to expand and improve these services. We have every reason to expect he will succeed, but we cannot at this point await future developments. We should all pitch in and contribute to an all out educational program.

In the first place, we must see to it that every housewife, home owner, farmer, and, in fact, each and every citizen of our land is made fully aware

(Continued on Page 111)

\*Newly elected president of the Entomological Society of America.

THE expanding agricultural chemicals industry has in recent years adapted antibiotics to further agricultural practice. Much attention has been given to the effectiveness of streptomycin for the control of fire blight of pears and apples, walnut blight, wildfire and blue mold of tobacco, bacterial spot of peppers and tomatoes, soft rot and black leg of potatoes and other bacterial diseases. Investigations have actually been made of several antibiotics for agricultural use and some have been given preliminary trials, but streptomycin has emerged as the antibiotic of choice in almost every case. This report deals with some of the experiments and trials relating to the agricultural uses of streptomycin.

As an example, a comparison between streptomycin and oxytetracycline is given in Table I. The *in vitro* data were obtained on a graduated concentration series using nutrient agar. The plates were incubated 24 hours at 28°C. after paper discs containing 0.1 ml. of the antibiotic solution in pH 8.0 buffer were put on each inoculated plate. The lowest concentration that provided a measurable inhibition zone is given in the table.

From the outset it was clear that for widespread use on plants the cost of the antibiotic must be reduced to a minimum. A partially purified form of streptomycin sulfate has been developed that is uniform and free of phytotoxic impurities. This has been tested rather widely during the past three years as "Streptomycin STS". Other forms of the antibiotic have been investigated also, i.e. the oil-soluble fatty acid salts and certain

## Laboratory and Field Studies of



"water-insoluble" forms that have been designated as STA, STB, STC and STD. In Table II some of their physical properties are summarized. The gradation in solubility of the "insoluble" forms will be discussed later, but it is clear that wide range of properties can be built into streptomycin formulations. The second mentioned, "Agristrep," is a trademarked name for a formulation of STS. It is being recommended for control of fire blight of pears and apples, walnut blight, wildfire of tobacco, bacterial spot of peppers and tomatoes and studied on a host of other crops.

These forms of streptomycin are remarkably stable materials in contrast to many other antibiotics. For example, storage of "Agristrep" for 10 weeks at 60°C. resulted in a loss of less than 5% in potency. The insoluble STB salt stored at 37°C. and 85% relative humidity for 28 days showed zero loss in antibiotic content.

The compatibility of streptomycin with over forty pesticides in aqueous

suspension or solution and as a dry film has been determined. The data will be reported elsewhere, but in general only the more reactive organic compounds cause serious losses in antibiotic. In this work the Maltol method of analyzing for streptomycin has been used. Essentially, this consists of hydrolyzing the streptomycin-containing material to form Maltol, which is determined colorimetrically after exposure to ferric ion.

In cases where antibiotic residues on treated crops may be involved, more sensitive assays are needed. The question of residues is an important consideration in the use of antibiotics or any pesticides on crops, and much effort has been spent on this phase. The two most satisfactory procedures developed are summarized below.

In one method, the treated plant tissue is thoroughly washed, blotted dry, frozen, thawed, wrapped in cheese cloth, pressed out in a garlic press and the juice assayed using the filter paper disc technique. The paper discs are placed on agar plates seeded with the streptomycin dependent *E. coli* (MB464) and also on plates seeded with *B. subtilis*. The growth and inhibition zones are compared with those obtained with a series of standard streptomycin solutions. As little as 0.5 mcg. of streptomycin per disc could be detected using *E. coli* as the test organism. The second method has been used to assay crops where a few grams of antibiotic were applied to an acre of crops, usually pears and apples.

TABLE I  
Comparative Effectiveness of Streptomycin Vs. Oxytetracycline

	Streptomycin	Oxytetracycline
Lowest conc. showing inhibition zone	3 ppm	13 ppm
<i>In vivo</i> results, 1952, Mitchell, et. al. <sup>3</sup>	No infection	Moderate Infection
<i>Erwinia amylovora</i>		
Lowest conc. showing inhibition zone	25 ppm	50 ppm
<i>In vivo</i> results, 1953, Heuberger, et. al. <sup>4</sup>	Significant control	Ineffective
<i>Xanthomonas vesicatoria</i>		
Lowest conc. showing inhibition zone	<3 ppm	13 ppm
<i>In vivo</i> results, 1953, Cox, et. al. <sup>5</sup>	None to light infection	Heavy infection



# AGRICULTURAL STREPTOMYCIN

By J. D. Garber, J. W. Rothrock, H. C. Reynolds and R. A. Gray

Merck & Co., Inc.  
Rahway, N. J.

Juice is obtained from the sample in question, for example, by pressing or by centrifuging a slurry prepared with water in a Waring blender. After clarifying the juice by filtering through a pad of supercel, it is passed slowly over an IRC-50 resin column on the sodium cycle. The column is washed free of fruit juice with several small portions of distilled water and the streptomycin retained in the resin is eluted with 0.1N hydrochloric acid solution. The unneutralized eluate is immediately frozen in dry ice and attached to a vacuum apparatus ordinarily used for freeze drying. A tube of sodium hydroxide pellets is placed in the line next to the vacuum pump to trap the hydrochloric acid vapors.

The dried product is dissolved in water and the solution assayed by means of plates seeded with a streptomycin dependent strain of *E. coli* or with *B. subtilis*. A quantitative result is obtained by a cup assay method and

a semi-quantitative value by spotting the solutions to paper discs and placing them on the seeded agar. Standard streptomycin solutions are employed in either case as a reference. Depending on the volume of juice processed, it is possible to concentrate the antibiotic a hundred-fold or more before carrying out the microbiological assay; hence, it is clear that an extremely small residue might be detected.

The presence of a residue has not been established, although many samples of pears, apples, peaches, beans and tomatoes taken from plots treated with streptomycin have been tested for the presence of antibiotic by one or both of the above methods. On the samples tested, up to four applications of a 100 to 800 ppm spray of streptomycin had been applied, chiefly at the blossom stage. In one case, tomatoes taken from a plot which had been sprayed two weeks before harvest

(200 ppm at a rate 100 gallons per acre) showed no detectable streptomycin.

One laboratory experiment produced some interesting results. Green tomatoes were soaked in a 250 ppm solution of streptomycin for two hours. The washed fruit then assayed 300 micrograms of antibiotic per 100 grams. After three days, the assay showed 13 to 160 micrograms per 100 grams, and at the end of 10 days no antibiotic could be found. This suggests that the normal ripening period given to green-picked tomatoes will be adequate in removing any traces of streptomycin that could arise from a late spraying treatment.

One interesting property of the oil-soluble and water-insoluble forms of streptomycin is their apparent slow release of antibiotic, which was studied by means of a technique suggested by Professor Peter Ark of the University of California. In this ex-

TABLE II  
Solubility of Streptomycin in Various Forms

Streptomycin Type	Percent Antibiotic As Free Base	Percent of Streptomycin Released In Water at 25°C.	
		1,000 ppm	100 ppm
STS	54	100	100
Agristrep	30	100	100
STA	10	63	74
STB	10	8	<1
STC	10	98	83
STD	10	90	83
Olate	18	39	55

TABLE III  
Duration of Activity of Streptomycin in Various Forms

Number of Transfers	Increase in Size of Inhibition Zone (Millimeters)			
	Direct Contact (a)		Indirect Contact (b)	
	STS	STB	STS	STB
0	13.1	6.2	5.3	0
1	10.5	6.5	10.7	5.6
2	7.5	3.8	10.7	4.2
3	0	2.9	5.9	4.6
4	—	3.3	0	6.3
5	—	0	—	5.3
6	—	—	—	4.1

(a) Streptomycin in direct contact with agar.

(b) Streptomycin covered with paper disc, diffusion required.

**TABLE IV**  
Absorption by Leaf of Antibiotic from Insoluble Forms of Streptomycin

Streptomycin Type	Conc in Leaf Juice: mcg./ml. Three Days	mcg./ml. Ten Days
STS	>>600	Dead
STA	200	300
STB	100	175
STC	600	600
STD	>600	>600

periment, filter paper discs are impregnated with a solution or suspension containing 25 micrograms of streptomycin in the form of STS and STB. These are dried and placed face down on an agar plate containing a culture of *B. subtilis* and the zone of inhibition measured after 24 hours. Then the disc was lifted off and without further treatment transferred to a second plate and the process repeated. From the data shown in Table III it is apparent that the soluble sulfate leached out quite rapidly, while the insoluble STB still showed activity on the fifth plate.

From this test it appears that some of the insoluble STB is physically removed by the agar, necessitating the use of a somewhat different procedure. The dried disc containing the 25 micrograms of streptomycin was covered with an untreated disc and the edges cemented together. Thus any escape of antibiotic must be through the paper. In view of the very insoluble nature of the STB the results shown in the fourth column of Table III are somewhat surprising. After the first plate, a rather high and constant activity was maintained. Again, the soluble form was exhausted much more rapidly.

The same relationship as noted in the above *in vitro* tests were true when the samples were dusted on bean or tomato leaves. The data shown in Table IV were obtained by dusting powders containing the different forms of streptomycin, each containing 10% antibiotic, on beans. A simulated dew was applied on the 1st, 3rd, 6th and 8th day after dusting. Several leaves were harvested uniformly from each plant three days after dusting and again ten days after dusting. Before assaying, the

**TABLE V**  
Absorption and Persistence of Antibiotics in Bean Leaves

		Antibiotic in Expressed Leaf Juice, Conc. Mcg./Ml., Days After Spraying	
<i>Leaves washed on 3rd Day</i>			
Streptomycin	600	600	800
Oxytetracycline	50	75	62
<i>Leaves not washed</i>			
Streptomycin	1,600	>1,600	
Oxytetracycline	800	600	

(a) Antibiotic applied as a 5,000 ppm spray.

leaves were washed thoroughly in running water with a camel's hair brush to make sure all surface particles were removed. The concentration of antibiotic contained in the leaf juice, in the case of the soluble form STS, is perhaps 100 times as great as obtained with the insoluble types.

The preceding data suggests that the insoluble forms may be useful where slow absorption of antibiotic by the plant would be preferred to a sudden high-level concentration such as produced by the soluble forms. A material like STB may also be required where topical activity as opposed to systemic action must be maintained.

It is a fact that in the 1954 field trials against several bacterial diseases on plants, the soluble agristrep was usually superior to the very insoluble STB when each was applied as a spray. The fact that the latter was effective in certain cases as a dust or spray but not in others indicates that further studies on the timing of application, concentration and other variables will be required in order to evaluate the potential of the insoluble forms of streptomycin.

It was also of interest to determine the persistence of streptomycin in the leaf juices following spray or dust treatment. Mitchell had previously studied the translocation of antibiotics when applied in a paste to the stem, and found that streptomycin was rapidly absorbed and translocated upward. Streptomycin was found to be the most active of the eleven antibiotics tested in this respect. In the investigations at Merck & Co., Inc., a 5,000 ppm water solution of streptomycin was sprayed onto both sides of the young primary leaves of six Pinto

bean plants. Three days later the leaves of one-half of the plants were washed thoroughly and harvested from two washed plants and two unwashed plants and then again four and seven days later. The leaves were frozen overnight, thawed and the juice pressed out and samples assayed in duplicate or triplicate for antibiotic content. Streptomycin was determined using *B. subtilis*. For comparative purposes, a similar series was run with oxytetracycline, using *S. aureus* for the assay.

From the data in Table V it is apparent that streptomycin is readily absorbed by bean leaves. This is particularly apparent when comparing the ratio of washed to unwashed values for streptomycin and oxytetracycline.

The build-up of resistance to streptomycin has been raised by English and Van Halsema who reported on *in vitro* experiments with *Xanthomonas vesicatoria* and *Erwinia amylovora*, where the resistance built up several-fold after 10 transfers. This is a well-known phenomenon common to many antibiotics, but we have been more concerned with the possible build-up of resistance to antibiotics in the field. Three years of large-scale field trials with Agristrep have produced no evidence that a streptomycin-resistant strain of plant bacteria has developed. ★★

#### Oregon Superphosphate Plant

A new superphosphate plant having an annual capacity of 20,000 tons is being planned by Hughes-Johnson Chemical Company, Portland, Ore. The company expects to have the plant in operation early in December.

AGRICULTURAL CHEMICALS



## NFA Convenes at Hollywood

**H**IGHLIGHTING the fall meeting of the National Fertilizer Association at Hollywood Beach Hotel, Hollywood, Fla., November 10-12, was the membership vote to approve the proposal for consolidation with the American Plant Food Council to form a new trade association, to be known as the National Plant Food Institute. (The APFC was scheduled to hold its membership vote at a special session December 1, in Washington, D. C.).

In connection with the consolidation, Dr. Russell Coleman, president of the National Fertilizer Association, advised the membership that "while recognizing that there have been certain advantages in having two competitive trade associations, never the less I have come to the conclusion that the industry can best be served through one strong national organization. I am convinced that if our two associations are consolidated into a stronger National Plant Food Institute, our program can be much more effective."

Dr. Coleman reviewed the activities of the NFA over the past year, and reported on some of the more recent NFA projects including the publication of a new book, "The Care and Feeding of Garden Plants" (Ag-

ricultural Chemicals, p. 18a. Nov. 1954); and the two new NFA films, "The Big Test", which relates to soil sampling, and "Weather or Not", relating to irrigation and fertilization in the humid areas in the United States (both films reviewed in *Agricultural Chemicals*, p. 19b, November, 1954). Premier showings of the films were made at the convention on November 10th. Also shown was a TV short on plant food deficiencies prepared by the NFA, which will be used on farm and garden television programs.

In a brief look at the government's farm program, Dr. Coleman reported that "last year, even though farm prices were 21 per cent below

1951, plant food sales continued to increase. Such a decline, "he continued," in farm income would have been disastrous to fertilizer sales ten of fifteen years ago. Today, our farmers have learned that fertilizers must be used for profitable farming regardless of whether farm prices are relatively high or low. Our Association takes some credit for changing the farmers' attitude towards fertilizer usage".

### Farm Income Outlook

**A** CONTINUED discussion of the agricultural situation was contained in a report by Oris V. Wells, USDA, Agricultural Marketing Service, Washington, D. C., in an address on "Farm Income in the Years

top left: G. G. Scott, Lion Oil Co.; Mrs. C. D. Shallenberger, Shreveport Fertilizer Works; R. W. Goldthwaite, Lion Oil Co.; C. D. Shallenberger, Shreveport Fertilizer Works.

bottom left: Charles F. Martin, Miami Fertilizer Co.; James Schell, Kingsbury & Co.; C. R. Martin, Miami Fertilizer Co.; E. W. Harvey Nitrogen Division, Allied Chemical & Dye Corp.

top center: R. L. Hockley, Olin Mathieson Chemical Corp.; Ralph E. Fraser, Summers Fertilizer Co., Inc.; J. S. Whittington, Olin Mathieson Chemical Corp.; J. B. Brinton, Jr., Hydrocarbon Prod. Co.

bottom center: W. J. Haude, Grace Chemical Co.; J. R. Taylor, Jr., Grand River Chemical Division Deere & Co. Mr. and Mrs. Ackerman, Grace Chemical Co.

top right: George E. Pettit, Potash Co. of America; Moultrie J. Clement, Merchants Fertilizer & Phosphate Co.

bottom right: Henry A. Kennington, The Raymond Bag Co.; T. C. Rogers, Nitrogen Division, Allied Chemical & Dye Corp.; G. W. Suggs, Nitrogen Division, Allied Chemical & Dye Corp.



Ahead". Mr. Wells summarized forecasts by Dr. F. Waugh (presented at 32nd Agricultural Outlook conference, Oct., 1954), and an article from "Demand and Price Situation" in making the following statement: "Farmers over the next several years are probably faced with a level price outlook."

Mr. Wells reported that "despite the fact that farmers will economize on production expenses for 1955 crops, we still expect a further increase in the use of commercial fertilizer, with supplies of phosphates for the coming season estimated at about the same, and of nitrogen and potash some seven or eight per cent greater for the coming season than were available in 1953-54".

top left: L. S. Kaniecki, Tennessee Corp.; Mrs. H. G. Cunningham, H. G. Cunningham, Tennessee Corp.

top right: Mr. and Mrs. Walter Sackett, A. J. Sackett & Sons Co.

2nd from top left: J. E. Totman, Summers Fertilizer Co., Inc.; William J. Murphy, American Potash & Chemical Corp.; E. M. Kolb, American Potash & Chemical Corp.

2nd from top right: Russell Coleman, The National Fertilizer Association; Mrs. Russell Coleman.

3rd from top left: S. S. Yates, Arkell and Smiths; F. L. Smith, Arkell and Smiths; S. T. Keel, International Minerals & Chemical Corp.

3rd from top right: W. C. Weber, Dorr Co.; S. L. Nevins, Olin Mathieson Chemical Corp.

4th from top left: George M. Barley, Diamond R. Fertilizer Co.; Mrs. Moultrie J. Clement, Merchants Fertilizer & Phosphate Co.; R. Ashcraft, Ashcraft-Wilkinson Co.

4th from top right: J. J. Patterson, Union Bag & Paper Corp.; S. K. Bradley, Union Bag & Paper Corp.

5th from top left: J. G. Carroll, Davison Chemical Co.; T. S. L. Pope, International Fertilizer Co.; W. Caspari, Jr., Davison Chemical Co.

5th from top right: J. Morse Smith, H. J. Baker & Bro.; W. H. English, Jr., H. J. Baker & Bro.; W. T. Doyle, Sturtevant Mill Co.

2nd from bottom left: Mrs. J. J. Devlin; J. J. Devlin, Southwest Potash Corp.; S. B. Tatem, Swift & Co.

2nd from bottom right: W. Huff, Ashcraft-Wilkinson Co.; Eugene German, Duval Sulphur & Potash Co.

Bottom left: Mercer Rowe, Ashcraft-Wilkinson Co., and L. Gopp, International Minerals & Chemical Corp.

Bottom-right: H. Kontz, Davidson Kennedy Co. and Edwin Kapusta, National Fertilizer Assoc.



Mr. Wells emphasized that certain economic assumptions must be kept in mind when considering reports on the supply and demand outlook. These, he said, are: (1) that per unit prices or cost rates paid by farmers will tend to hold fairly close to current levels, with some tendency toward a downdrift, and (2) that productivity and employment in the American economy generally will be such as to allow a continuing gradual increase in the average American standard of living. Mr. Wells indicated also that the most encouraging feature in the farm income and supply picture centers on the interest farmers and their own organizations are taking in the marketing job.

#### Organic Farming

WHERE farm areas include livestock breeding, poultry farms, etc., with the inevitable production of manure, it is completely normal and logical for farmers to use this natural fertilizer in their land cultivation practices. Still for most efficient and economic practice, it is essential that farmers substantiate organic manures with chemical fertilizers. Such was the general approach in the report by Richard Bradfield, Cornell University, Ithaca, New York, who reviewed the practice of organic farming in combination with use of chemical fertilizers in his address before the association.

Dr. Bradfield pointed out that "There is no question but that properly made compost is a very good fertilizer. In terms of its plant food content, however, it is a very-low grade, very bulky fertilizer. It is made up of various materials such as garden waste, garbage, leaves, etc. well piled in the proper manner, moistened to the proper moisture content, turned on the average two or three times during the ripening process. Losses during this process are high. Frequently half of the organic matter is lost during the composting process. Commonly, 20 per cent of the nitrogen in the form of manure is lost during rolling, and 76 per cent of the available nitrogen disappears. All of this seems to me to indicate that

making a compost of farm wastes is a rather wasteful process, wasteful of organic matter, wasteful of nitrogen, wasteful of human labor. We have made many studies of the best ways of handling the supplies of farm manure produced on our farms. These studies all indicate that the less handling the better. Whenever possible, our dairy farmers haul manure directly from the barns to the fields and plow it under as soon as possible.

The cost of handling even this product, which is probably the most valuable of all organic manures, is with the present price of labor on farms, so great that it is difficult for farmers who have no use for manure to get their neighbors to take it out of their barns for hauling."

Reading from left to right, top photo: J. E. Henderson, Jr., W. H. English, Jr., H. V. B. Smith, J. Morse Smith, J. W. Reisack, J. McCabe, all with H. J. Baker & Bro.

Second from top: Gene Van Deren, Bluegrass Plant Foods, Inc.; R. S. Rydell, Coronet Phosphate Co.; Jack B. Snyder, Snyder Chemical Co.; Tom L. Jones, Arkell and Smiths; W. W. Johnson, Stadler Fertilizer Co.

Third from top: Paul T. Truitt, American Plant Food Council; Cedric G. Gran, Olin Mathieson Chemical Corp.; Roy F. Camp, Chilean Nitrate Sales Corp.; C. D. Shallenberger, Shreveport Fertilizer Works.

Fourth from top: F. Jacobi, Union Bag & Paper Corp.; Cecil Wadleigh, USDA; V. Sauchelli, Davison Chemical Co.; B. D. Cloaninger, Association of American Fertilizer Control Officials; Mr. and Mrs. M. H. Lockwood, International Minerals & Chemical Corp.

Fifth from top: H. G. Cunningham, Tennessee Corp.; G. V. Taylor, Spencer Chemical Co.; Jos E. Culpepper, Spencer Chemical Co.; C. K. Horner, Department of Commerce.

Sixth from top: M. K. Miller, Tennessee Corp.; M. H. McVickar, The National Fertilizer Association; Dr. Richard Bradfield, Cornell University; Mrs. Richard Bradfield.

Second from bottom: B. J. Jones, Sunland Industries, Inc.; S. B. Tatem, Swift & Co.; R. R. Worthington, Bagpak Div., International Paper Co.; W. L. Gay, Berkshire Chemicals, Inc.

Bottom photo: John M. Brentlinger, E. I. DuPont de Nemours & Co.; R. W. Goldthwaite, Lion Oil Co.; G. G. Scott, Lion Oil Co.; C. D. Bell, E. I. DuPont de Nemours & Co.





top: R. S. Rydell, Coronet Phosphate Co.; Lucian Walker, Texas Gulf Sulphur Co., Inc.; Paul Soule, Grand River Chemical Division Deere & Co.; C. J. Byrd, Spencer Chemical Co.

bottom: W. E. Schaffnit, Stedman Foundry & Machine Co., Inc.; F. J. Purcell, Combustion Engineering, Inc.; George Wash, Phillips Chemical Co.; John Gale, The National Fertilizer Association.

Mr. Bradfield further reported that "For most farmers, the only economical way to get more organic matter on their soil is to grow more organic matter on their own farms. Larger crops will mean more roots, more stalks and stubble, more feed for livestock, and hence more manure to return to the soil. The cheapest way to grow these larger crops is by more liberal fertilization and by the use of good soil building rotations, in which the soil is so handled that maximum efficiency is obtained from the fertilizers".

According to Dr. Bradfield, organic matter maintenance is a relatively simple matter for a general livestock or dairy farmer, since he can normally keep from 25 to 50 per cent of his land in pasture and forage crops, in both of which perennial sod-forming legumes will ordinarily be present. Dr. Bradfield reported that manure with the residues from leguminous forage crops, if supplemented with even modest quantities of the proper chemical fertilizers, will, in most cases do a fairly good job of maintaining the organic matter contents of the soil.

In discussing the extent to which chemical fertilizers are and will be used in organic farming practice, Dr. Bradfield reviewed the background of commercial fertilizer use and pointed out that southern farmers were formerly inclined to use commercial mixed fertilizers more regularly and liberally than other sections of the country because the livestock and

dairy industry was never highly developed as a whole in these areas. Also, prior to 1930, he noted, the supply of commercial nitrogen was small and expensive, and potash, too, was in low supply, which certainly did not encourage use of the commercial fertilizers by farmers who had ready access to manure, etc.

Still another limiting factor in previous years, reported Dr. Bradfield, was the price of fertilizer as compared with crop income . . . nitrogen for example, was 20-25 cents a pound and corn brought only 50 cents a bushel. At this price relationship, said Dr. Bradfield, if nitrogen was used at the usual efficiency, it would produce only enough corn to pay for itself.

Dr. Bradfield summarized this review by reporting that today the ratio of price of fertilizers to agricultural products is more favorable than ever before. Nitrogen at about ten cents a pound, he commented, com-

pares with corn which brings \$1.50 a bushel, and farmers are thus tempted to use more fertilizers. "For the highest type of agriculture", Dr. Bradfield concluded, "it is not a question of organic or chemical fertilizers; both are essential and as inseparable as Siamese twins".

#### Committee Reports

**M**R. E. A. Geoghegan, Southern Cotton Oil Co., New Orleans, NFA board chairman, presided at the convention sessions and presented to the membership background information on the NFA and APFC prior to the consolidation vote. Mr. and Mrs. Shaw, Hector Supply Co., Miami, headed the hospitality committees, while arrangements and program planning were managed as usual by the NFA staff.

Added features were previews of the Association's two new sound-color motion pictures: "Weather or Not" and "The Big Test." The NFA also showed its new book on "The Care and Feeding of Garden Plants," published in cooperation with the American Society for Horticultural Science.

On the lighter side of convention activity, a fashion show was presented at the Ladies buffet luncheon, November 10th, and an aquatic show on the evening of November 11th, following the convention banquet. H. J. Baker & Bros. sponsored a cocktail party prior to the banquet.

NFA Bulletin Board displayed at Hollywood conference, showing recent booklets, posters, leaflets, etc., issued by the Association.



# Dusting, Spraying Conference

by Charles Starker

**Y**AKIMA, Washington, played host to more than 200 agricultural aircraft operators, pilots, field men, equipment manufacturers, pesticide formulators and state and federal researchers at the sixth annual Washington Aerial Dusting & Spraying Conference here October 26-27. The two-day sessions covered many phases of the regulation of aircraft equipment and pesticide application, research on herbicides, use of aircraft in forestry, and in control of some of our most troublesome insect enemies.

Licensing of custom applicators was discussed by Auburn Norris, Washington State Department of Agriculture, who reported that some 70 aerial applicators are currently licensed, and about 208 planes cleared for use. 136 licensed ground operators run some 215 rigs in the state.

G. H. Ridder, also of the same department, outlined the responsibilities of his office in the regulation of pesticide usage on legume seed crops, determining areas in which chemicals cannot be used, and the restrictions which apply to applicators: to keep equipment in good condition, use correct timing on insecticide applications, keep records of date, type, amount of chemical used, name and address of property owner, and the weather—this report to be rendered to the department. Operators must know how to dispose safely of chemicals, and how to clean equipment properly. They should also notify the department of changes of address or leasing of new equipment. The department sets dates of hearings to

designate restricted areas. Operators were urged to comply with rulings of the state aeronautics commission and to procure their annual licenses after examination.

Charles S. Chester, Washington State Director of Aeronautics, discussed procedures for registration of resident and out of state operators and ways to obtain crop-dusting licenses.

## Herbicide Damage

**D**AMAGE to grapes of a general nature was noted this season, Dr. Earle Blodgett of the Prosser station stated. He was also to duplicate symptoms by exposing grapes to known amounts of 2,4-D. Damage also occurred on tomatoes and wheat. Hops which had been exposed had white, fluffy cones that produced seeds, while normal cones do not. Damage was local, and leaves were seldom malformed. Early varieties of peaches, south of Wenatchee were hardest hit. The fruit became enlarged, ripened early and then cracked. These symptoms were duplicated by exposing normal peaches to known quantities of 2,4-D.

A late September survey at Sun-

nyside and Prosser revealed some contamination of Bartlett pears.

Damage to grapes from 2,4-D was less this year than last. Dr. Blodgett indicated his feeling that this may be due to: 1) restrictive legislation, 2) less wheat sprayed, 3) grapes were not in a susceptible stage of development when the wheat was sprayed.

Mass air contamination is still a factor. Ground sprayer application of 2,4-D apparently is local in nature and probably not the chief source of injury to grapes and other crops. Aircraft spray is largely responsible. 2,4-D should be used with caution. However, there has been a definite improvement in the overall picture, the speaker concluded.

A summary of a 5-year study on 2,4-D on grapes was given by Dr. Walter Clore, horticulturalist at the Prosser station. He told the group that grapes are still highly susceptible to herbicides. Exposure is from two sources—air mass and direct. In his opinion it is impossible to remove herbicide spray residues completely from spray tanks. To be safe, separate equipment must be used.

Dr. Lowell Rasmussen, Washington State College Agronomist, out-

(L to R) Bruce Coombs, Coombs-West-Air, Yakima, vice-president and chairman of Agricultural Board, Washington State Agricultural Aviation Assn.; Dr. H. S. Telford, chairman, Washington State College; Dr. Lowell Rasmussen, Agronomy Dept., WSC.





lined a 2,4-D test program, which is set up to measure gross differences in materials. He stated grower evaluation is often faulty, due to differences in soil type, fertility, variety, drainage, or other factors. Their testing is done at several stations and in the field. Work done during the 1953 season showed little difference in materials at rates of  $\frac{1}{2}$  to 1 pound of 2,4-D acid per acre, as conditions for weed control were very favorable. Three amine and six ester formulations were used on gromwell and tarweed in wheat.

1954 was a tougher year for weed control, and there was a big difference between the  $\frac{1}{2}$  and 1 pound rates.  $\frac{1}{2}$  pound was too light, and his recommendation calls for  $\frac{3}{4}$  to 1 pound per acre.

The ten materials tested this season were 2 amines, 7 esters and one 2,4,5-TP formulation. This last chemical has been claimed by some to be effective against certain of the 2,4-D resistant weeds. In their experience, however, 2,4,5-TP was quite disappointing, as it worked out in only one area. All ester formulations at 1 lb. gave excellent control, and the low volatile esters at the same rate were very good, with few weeds left in the plots. Low volatile and high volatile esters gave about equal control results. He does not believe low volatile formulations are superior to the regular esters. His studies on 2,4-D carriers using water, diesel and water-urea solutions in the field showed similar results, as weather was too cool after these were applied to show any marked differences. He is of the opinion that better carriers than water or diesel are needed for 2,4-D.

#### Fungicides by Air

**D**R. Roderick Sprague, plant pathologist of the Wenatchee station, discussed the growing use of Karathane for control of powdery mildew. This product is reported to be especially useful on sulfur-susceptible species. His suggestion for plane application would be a 4% dust, or a 2% dust on mixed varieties. If dusting sulfur is used on Winesaps at the suggested rate of 50 lbs. per

acre, such application should be made with caution.

Scab will most probably be light in some areas this season, he predicted, but it can infect very rapidly under favorable conditions. The use of a 3% Phygon dust has given good results, but the material is irritating to the skin. 15 or 20% Captan or 15% Ziram dusts might help in control of pin-point scab. By using planes, growers should be able to keep ahead of scab in bad years. Manganese carbamate, an organic sulfur, is suggested for use as a 15% dust, but care must be exercised if it is used on Rhomes.

Mildew on peas has been noted at intervals. Sulfur dust at 30 lbs. per acre will do a satisfactory control job, the speaker said, but most people make their applications too late. Sulfur must be applied early to do the job, he continued. Karathane dust, 1%, he added, will do an even better job.

Use of streptomycin for fireblight looks promising. The timing for sprays is at full bloom, again in 10 days, and then another application in 10 days. The maximum length of time between treatments should be 10 days.

Snow-mold, a rot of winter wheat, may be caused by two or three different organisms. Worst injury is in March and April. Control materials should be applied in late fall before the snow cover is on the ground. A special Ceresan preparation at  $2\frac{1}{2}$  lbs per acre in 10 gallons of water is suggested. If the type of Ceresan used in seed treating is used, this rate must be doubled. Sprague believes the air application of chemicals for snow mold control will open up a new market for the aerial applicators.

#### Aircraft in Forestry

**T**HE use of planes in forest protective work has increased each year, James C. Evenden, USDA Division of Forest Insect Research, Coeur d'Alene, Idaho, stated. Such use has gone from early experimental use to one of standard operating procedure. The first forest spray job they tackled was a 415,000 acre

operation in the Moscow, Idaho area. Destructive forest pests in the west are all native. The current lumbering picture makes all types of trees valuable—even those which used to be considered as "weed" trees. This is one of the reasons why insect damage has become increasingly important. In this area the Engleman spruce beetle has destroyed some two billion board feet of timber, worth some 170 million dollars if milled.

While losses from bark beetles are normally not too great, Evenden pointed out that interruptions of natural control factors—parasites, diseases, birds—allow beetles to go into high gear in brood production. The progeny from one pair of uninhibited bark beetles in three years could ruin some 90,000 trees.

One of the jobs of the Division of Forest Insect Research is the establishment of a forest insect survey so the status of destructive pests may be known at all times. In the northern Rocky Mountain area, use of ground survey teams is slow and expensive. Using survey planes, one plane in a few hours can do the same job a ground crew can do in several months. In one Montana area a 75 hour air survey gave them the same data that it would take a ground party 75 days to gather. Air observers are trained to recognize tree species by the crown shape, and "buggy" trees have a distinctive color. Their usual flight level is about 500 ft., but at times it is necessary to get a closer look at trees to determine if some other factor besides insects is involved.

#### Aerial Application Research

**S**UMMER trials on truck crop pests by air were mainly discouraging. Dr. J. C. Chamberlin, Entomology Research Branch, Forest Grove, Oregon, told the group. The green peach aphid on potatoes has become resistant to DDT and certain organic phosphates in the Yakima Valley, Klamath Falls, and Tule Lake areas. Air spray applications of parathion at 2 lbs technical, and TEPP at 1 quart of 40% material were not effective in giving desired aphid control. Their work showed

#### AGRICULTURAL CHEMICALS



that only about 31% of the spray reached the underside of potato leaves. He thinks dust applications might be better, as they would possibly give better penetration of the vine canopy.

On pole beans, an air application of malathion and chlordion gave little control of nitidulid beetles. Their experimental use of a DDT spray on sweet corn for control of corn earworm did not give satisfactory control. The use of DDT in both a spray and dust form gave excellent control of pea weevil on canning peas.

Kenneth Messenger told the group about the activities of the Plant Pest Control Branch, Plant Industry Station, USDA, Beltsville, Md. This branch works with both ground and air equipment, and they are chiefly concerned with finding out the most effective control measures to be used against imported insect pests. They take the most effective equipment available and then use the insecticide materials which have been most promising in small scale tests. Actual field tests are often done on a commercial scale.

At present their work with granular insecticides against the Japanese beetle, White Fringed beetle and European chafer looks very promising. Granular applications have not been too uniform in their experience, but granular materials tested against spray applications on Japanese beetle have shown about equal results.

Their slant on the fertilizer-pesticide combination idea is to suggest the use of a divided hopper, so that fertilizers and pesticides may be separated up to the time they are applied, and the rates of either may be varied according to soil type, crop or other conditions.

Airplanes have been pressed into use in flight habit studies of pink boll worm moths. Planes are fitted with traps that may be opened at different elevations, and are sent out at intervals from daylight to dark. As a result of their work, considerable information on migration and flight elevation of the moths has been obtained. Another conceivable use

of planes could be in the release of sterilized male screw worm flies, if this program should be carried out in the U. S. Relatively large-scale releases of sterilized screw worm flies were made on the island of Curacao, with excellent results. Some 50 to 80 planes would be busy for a year if the program ever was set up, stated Mr. Messenger.

#### Agricultural Aviation—What's Wrong?

JOHN Neace, Marsh Aviation, Phoenix, told the group their industry is faced with a pilot shortage. The average age of pilots is 35. Financial incentive is needed to attract new blood. Something is wrong, he suggested, with a situation in which applicators are still operating under CAA waiver—after all these years.

70% of all fatalities in 1952 were beginners, and 70% of these fatalities happened on the way to the field or in returning; the cause—low altitude acrobatics. The accident rate in agricultural aviation is comparable to that of carrier pilots—one fatality to 14,000 hours.

Air applicators have no business selling agricultural chemicals, Neace stated. They are only complicating their business and adding to their operating expenses. Because certain heedless operators in some states have applied phosphate insecticides in a careless way, he advocates use of a red coloring agent in all phosphate materials.

#### Health Hazards of New Pesticides

"NO doubt some of the safety precautions recommended for pesticides may sound unimportant to those who work with them," Dr. Wm. Upholt of the U. S. Public Health Service Toxicology Laboratory at Wenatchee, Wn. stated. "However, they are based on factual information, including that gathered under conditions of actual field usage." In the case of parathion exposure, Dr. Upholt mentioned the dermal route as giving most cause for concern.

Failure to observe simple precautions such as the suggestion to "destroy empty cartons and contain-

ers", may result in situations similar to the recent fatal poisoning of a child in Hood River, Oregon. Burning, or otherwise properly disposing of cartons or containers would have eliminated this source of potential danger. If all users of agricultural pesticides would follow precautions on the label, accidents would be prevented before they had an opportunity to start, he counseled.

Dr. Upholt commented briefly on the statement made by Mr. Neace advocating the addition of a red coloring agent to all phosphate insecticides. He stated the use of coloring materials is a complicated problem, and children are frequently attracted to red objects. He suggested that if agricultural pilots would follow current recommendations, phosphate materials could be applied in such a way as not to constitute a hazard to man or animals.

Questions submitted to Dr. Upholt in advance of the conference showed considerable interest in the effects of pesticides when applied to crops, or accidentally to livestock. Several wanted to know about effects of 2,4-D on livestock, and of insecticides on farm animals. The USDA research people are directly concerned with questions of this nature, Dr. Upholt said. He stated that chemicals toxic to man present similar hazards to livestock, but insecticides recommended for use on stock may certainly be used safely when such use is in accordance with label directions.

Contamination of forage and cover crops by phosphates poses a real problem. Where they accidentally receive this type of treatment, grazing should be prohibited for at least two weeks. If highly volatile products such as TEPP are the materials involved, the waiting period would not need to be nearly that long.

Certain crop defolianters are now being considered for possible use on beans in the Columbia basin. One material which might see some use is sodium arsenite. Such usage raises the question of possible residues at harvest. 2,4-D and 2,4,5-T should  
(Continued on Page 111)

# CACA Elects Anderson

**Canadians hold second annual meeting at Seignior Club in Montebello...New officers elected**

**T**HE 2nd annual meeting of the Canadian Agricultural Chemicals Association held October 28-29 at the Seignior Club, Montebello, Quebec, featured several group discussions on uses of agricultural chemicals, marketing, diseases, etc. Another highlight was the election of officers for 1955.

In a business meeting opening the convention, the membership voted to add two new directors so that in the future it will be possible to give more adequate representation to the western provinces of Canada while still making it possible to get a quorum readily for directors' meetings. Mr. Carter, retiring president of the association, announced that there are now thirty active members and two associate members. In the future, annual meetings will be held in the Fall of the year. New officers elected are as follows: President, M. F. Anderson, Naugatuck Chemicals, division of Dominion Rubber Co. Ltd., Montreal; 1st Vice-president, Ramsay G. Smith, Charles Albert Smith Ltd., Toronto; 2nd Vice-president, E. P. Aikman, The Nichols Chemical Co. Ltd., Montreal; Secretary, K. B. Owens, Monsanto (Canada) Ltd., Montreal; and Treasurer, M. E. Ward, Dupont Canada Ltd., Montreal.

J. H. Elliott of Rohm & Haas Company of Canada Ltd., Toronto, was named as a director. The following continue as members of the Board of CACA for additional two-year terms: R. M. Ferguson, Dow Chemical Co. of Canada Ltd., Regina, Sas-

katchewan, and J. D. Ruttan, Chipman Chemicals Ltd., Winnipeg, Manitoba.

The retiring President, Arthur H. Carter of Green Cross Division of the Sherwin Williams Company of Canada Ltd., Montreal, will serve a one-year term as a director ex-officio. The two new directors authorized at the meeting will be named for interim appointments by the present board.

Members of the new nominating committee were announced as follows: Chairman, H. S. Smith, Arthur H. Carter, P. E. Redman, H. V. Casson and the retiring chairman of this year's nominating committee, A. W. Hutchinson of Shell Oil Co. of Canada.

The technical section of the association named Herbert Pass of Sherwin-Williams Co., Montreal, as new chairman, succeeding J. H. Follwell, Shell Oil Co. of Canada, Toronto, retiring chairman. The new vice-chairman is A. W. Loughheed, of Naugatuck Chemicals, Elmire, Ontario. The new secretary is D. K. Jackson, Monsanto Canada Ltd., Montreal succeeding J. W. Busch, Niagara Brand Spray Co. Ltd., Burlington, Ontario.

J. H. Ross of Canadian Industries Ltd., chairman, of CACA's traffic committee, reported on the results of a conference held with the rail lines at the offices of the Canadian Freight Association to determine rate classifications on shipments of agricultural insecticides, herbicides, fungicides, etc. under the Canadian

Railway tariffs. The industry has been advised that where commodity items in Canadian Railway tariffs provide for the following: "insecticides, agricultural, poison content not exceeding 2% and so certified on shipping order and bill of lading", it is to be understood that "poisons" are those named in Board of Transport Commissioners for Canada regulations for the transportation of explosives and other dangerous articles in rail freight and rail express service, commonly referred to as the "Red Book". If an ingredient, pure or dilute, is classified as a poison in the "Red Book" it is the percentage of this ingredient in the agricultural insecticide which determines the poison content of the insecticide.

Mr. Ross pointed out that insecticides, fungicides and herbicides are commonly shipped in Canada under two rate classes—fifth and seventh. The seventh class rate is substantially lower than the fifth class—about 70%. Where the poison content of a product is under 2%, it is permissible to ship it at the seventh class rate.

In determining rate classification, the first important factor is whether or not the "Red Book" lists the product as a poison. DDT for instance, the speaker pointed out, is not listed as a poison. Aldrin is a poison in the pure state and is also classified as a poison in mixtures exceeding 15%. Mercurials, arsenicals and phosphates are also classified as poisons and thus must be shipped at the fifth class rate. If the content of such materials as aldrin is sufficiently low however—

# at Montebello

## Top Photo, right:

Officers and directors of CACA: (l. to r.) Ramsay G. Smith, Chas. Albert Smith, Ltd., Toronto, 1st vice-president; J. H. Elliott, Rohm & Haas Co. of Canada Ltd., Toronto, director; J. D. Rutten, Chipman Chemicals Limited, Winnipeg, director; K. B. Owens, Monsanto Canada Ltd., Montreal, secretary; M. F. Anderson, Naugatuck Chemicals, division of Dominion Rubber Co. Limited, Montreal, president elect; E. P. Aikman, Nichols Chemical Co. Ltd., Montreal, 2nd vice-president; and A. H. Carter, Sherwin-Williams Co. of Canada, Ltd., Montreal, retiring president and ex-officio member of the board.

Missing when the photo was taken were: M. E. Ward, Dupont Canada, Ltd., Montreal, treasurer; and R. M. Ferguson, Dow Chemical of Canada, Ltd., Regina, director.

## Bottom photo, right:

Old and new officers of the Technical Section of CACA: (l. to r.) D. K. Jackson, Monsanto Canada, Ltd., Montreal, secretary; H. J. Folwell, Shell Oil Company of Canada, Toronto, retiring chairman; Herbert A. Pass, Sherwin-Williams Com-

pany of Canada, Montreal, chairman elect; J. W. Busch, Niagara Brand Spray Co., Ltd., Burlington, Ont., retiring secretary; and A. W. Loughheed, Naugatuck Chemicals, Elmire, Ont., vice-chairman.

under 2%—they may be shipped at the seventh class rate.

The traffic committee is examining the whole question of classifications and shipping rates, and among other matters which it is taking up with the authorities, is the privilege of mixing carloads. They are hoping to secure such permission without rate penalty.

## Plant Disease Control

**F**EATURED at the opening session of the meeting was a panel discussion, "Chemical Control of Plant Diseases in Canada", in which the following participated: chairman, Dr. A. J. Skolko, Botany and Plant Pathology Division, Ottawa; L. C. Callback, Science Service Laboratory, Charlottetown, P.E.I. discussing potato diseases; G. C. Chamberlain, Plant Pathology Laboratory, St. Catharines, Ont. discussing fruit crop diseases; Dr. L. W. Koch, Science Service Laboratory, Harrow, Ont., discussing vegetable and special field crops diseases; and Dr. M. W. Cormack, Science Service Laboratory, Lethbridge, Alta. cereal and forage crop diseases. Future trends in the fungicide field were outlined by Dr. R. A. Ludwig, Science Service Laboratory,

London, Ont.

Dr. Ludwig suggested that the problems encountered in developing an efficient fungicide are normally more difficult than those which face the worker in the insecticide field. Thus, progress has not been as spectacular in the field of fungicide development as it has been in the insecticide field. Progress has been made, of course, but Dr. Ludwig indicated that in his opinion, at least, the industry has not produced really satisfactory fungicides as yet.

He emphasized that fungicides function in an extremely complex manner. The research worker cannot assume fungicidal activity from mere structural similarity in compounds.

Discussing antibiotics, he indicated his opinion that they will have specialized uses on specific crops. He cited as the outstanding example of antibiotic use thus far, the use of streptomycin for control of fireblight. Systemic fungicides look promising as a field for profitable future research, he added.

Dr. Ludwig concluded with the prediction that future developments in the fungicide field will probably occur along two lines: One, improve-

ment in the efficiency of materials now being used (for example, the efficiency of sulphur can be improved by securing optimum particle size) and two, the development of new materials. Along this line he suggested that there are promising prospects for the future in the adaptation of fungicides to low-volume use. Equipment for low-volume application is being improved, and future prospects are bright, he suggested, for application of low-volume fungicidal materials. New materials are also being developed, he added, which are considerably more specific in the control that they afford.

## Newer Materials Reviewed

**I**NFORMATION on Some of the Newer Agricultural Chemicals was the theme of three other talks which wound up the Thursday afternoon, October 28th session. Dr. F. E. Barron of American Cyanamid Co., New York, discussed malathion, Dr. H. D. Tate, U. S. Rubber Co., discussed maleic hydrazide, and Dr. R. C. Scott, Chemagro Corp., discussed methyl systox. In his comments on malathion, Dr. Barron emphasized that mammalian toxicity is normally the limiting factor in extending the use of a new pesticide. American

Cyanamid have, over recent months, been testing malathion as compared with parathion for acute oral toxicity, dermal toxicity and cholinesterase inhibition. Test results to date indicate that malathion is comparatively safe for widespread use.

Dr. Barron discussed the following list of possible new uses for malathion:

*For use in control of external parasites on poultry.*—Effective control was obtained for this use, with acceptable safety. The company is currently seeking registration of the product for this use on poultry roosts, nests, etc. Registration is not being sought at present for direct application to poultry pending the results of further tests.

*Control of external parasites on cattle.*—Malathion was found upon test to control ticks satisfactorily, but repeat applications were necessary. They are now testing to determine whether such repeated applications—up to sixteen—may safely be made. Acute oral toxicity tests are also being made, and the results of these various tests will determine whether or not malathion can be used on cattle.

*Stored grain insects.*—Malathion dusts and sprays proved to be effective in the control of stored grain insects. Tests are now under way to determine efficiency under field conditions. They are also checking to determine whether residues will present any problem.

*Household insecticides.*—Malathion has been used in southwestern United States to control resistant cockroaches. Masking agents have been employed to cover the odor which, of course, presents a problem, and the company is also trying to produce malathion with an improved odor.

*Fleas on dogs and cats and sarcoptic mange mites on dogs.*—Malathion has shown promise in early tests for control of fleas on dogs and cats, with no apparent toxicity drawbacks.

Dr. Barron emphasized that all of the work reported upon should still be considered as work in progress—the only exception to this being that

results on poultry have been sufficiently conclusive so that the company has already moved to secure registration of malathion for this application.

In his discussion of maleic hydrazide, Dr. H. D. Tate said that at present this growth inhibitor is being used for the following applications:

To prevent growth of suckers on flue-cured tobacco. One spray gives good control. Tests to date have indicated that it has no unfavorable effect on quality or yield, and may even improve both. It was used commercially for this purpose in 1953 and 1954.

Maleic hydrazide controls sprouting of onions and potatoes in storage—as well as other vegetable crops—even at elevated temperatures.

MH also controls quack grass. Good control is possible with this material without any alteration being necessary in cropping practices. The farmer can plant a crop immediately after spraying. MH is not suggested for use on home lawns, golf courses, etc., as it has proved most efficient on areas that otherwise would have to be mowed often.

The product is also being used on privet hedges as well as some other miscellaneous uses which the speaker mentioned, including on peaches, olives, sugar beet and to control wild oats in barley and flax.

MH—being a relatively new material—is still quite expensive at present, but Dr. Tate indicated a definite expectation that the company may be able to get the cost down. Also, there are more promising possibilities for the future in that improved formulations giving better performance at lower costs may be developed.

Dr. Scott prefaced his discussion of methyl systox with some general remarks about the advantages of systemics. He pointed out that when systemics are used, wide latitude is afforded in method of application. Application to the foliage or roots is possible, for example. The second advantage is that insecticidal efficiency is greatly prolonged compared with contact poisons. Ease of control with systemics is a further advantage: the

insect need not be hit directly. All of these advantages are in addition to the prime advantage of systemics, which is absence of kill of beneficial insects.

Systox, one of the earlier systemics, is being used commercially in the United States on potatoes and apples, and also on such non-food crops as cotton, ornamentals and non-bearing fruits. Methyl systox is essentially the same material as systox, with the methyl group replacing the ethyl group. Incidentally, Dr. Scott added that the commercial name for the product will be Meta-systox.

Comparing methyl systox with systox, parathion and TEPP, Dr. Scott emphasized that methyl systox is much less toxic and much less of a cholinesterase inhibitor. However, it is not as effective an insecticide, being only about one-half as efficient as systox.

In his opinion, methyl systox is a thoroughly feasible commercial product. More development work is needed, he added, but it is their opinion that they can solve the problem of the larger applications which will be necessary, and the industry will then have a safer product with which to work. The company looks for commercial use of methyl systox in a year or two.

#### Sees Expanding Herbicide Market

A PANEL discussion reviewing results from the research program on pest control conducted by the Canada Department of Agriculture opened the Friday morning program. Robert Glen, chief of the Entomology Division, acted as chairman of the panel, with the following participating: W. A. Ross, head of the Fruit Insect Unit, Dr. A. J. Skolko, assistant chief Botany and Plant Pathology Division, and Dr. P. O. Ripley, chief Field Husbandry Division.

Dr. Ripley's comments on herbicides and their use in Canada were of particular interest to the group. He followed the growth of the spraying program in Canada from a few thousand acres in 1945 to 500,000 acres in 1947, 4,000,000 acres in 1948, 8,000,000 in 1949, and 12,000,000 in





The CACA convention attracted a wide attendance from the U. S. Among those on hand were: John Stoddard, Prentiss Drug & Chemical Co., New York; Jack Polite, Diamond Alkali Co., Cleveland; A. E. Collazo and Bob Zipse of John Powell & Co., Div. of Mathieson Chemical Co.



Two members of the Reception Committee, A. L. Havard, Sherwin-Williams Co. of Canada (extreme left) and James Stewart, Charles Albert Smith, Ltd., (far right) greet Dr. Robert Glen, Dr. P. O. Ripley and Dr. W. A. Ross, all of the Canada Department of Agriculture, Ottawa.

1950. The total value of herbicides sold in 1951 was just under \$7,000,000, and by 1954 some 270 different herbicides had been registered for sale. He indicated that of the twelve to thirteen million acres sprayed annually in Canada probably 98% is in the three Prairie Provinces of Western Canada.

Probably little further increase in this acreage can be expected in Western Canada, Dr. Ripley predicted, until new and improved herbicides are perfected. The acreage sprayed has been mainly in areas where easy-to-kill weeds such as mustard, stinkweed, Russian thistle, lamb's quarters, etc., have been prevalent, and there is little future for use of such herbicides as 2,4-D to control wild oats in grain crops. However, he added, that if a spray can be developed to kill wild oats selectively in grain crops, the area sprayed in the Prairie Provinces might easily be doubled. And similarly, in Eastern Canada, if products can be developed to kill some of the predominant weeds without killing clover, use of herbicides for weed control in these areas could be greatly increased.

Quoting figures on extent of crop loss chargeable to weeds, he indicated that a rough estimate for 1954 would be in the neighborhood of \$200,000,000. Recent experimental results indicate a loss of 14% in oats from a light infestation of mustard in Ottawa, while in Quebec a heavier infestation reduced yield 42%. At Kapuska-

sing perennial sow thistle reduced yield 46%. He added that some weeds consume more moisture than do cultivated crops, and that weeds are also strong competitors of crop plants for essential nutrients in the soil. At Massachusetts, for example, he pointed out that Venegris showed one-half ton of lamb's quarters contained 26 pounds of nitrogen, 3.7 pounds of phosphorus and 43.4 pounds of potassium, enough nutrients to produce 15 bushels of corn.

Looking to the future, he noted with encouragement that maleic hydrazide shows promise for controlling wild oats in wheat, barley and flax. Dalapon has given a measure of control of wild oats in sugar beets, and CMU has likewise been effective. Dr. Ripley concluded with the following comments on some of the pressing problems that will affect the use of herbicides in Canada in the near future:

"There are several rather clear cut and important problems which need attention. One of the first and most important, I believe, is the simplification and standardization of products. There are entirely too many formulations, particularly of 2,4-D, and the variable acid content and rate and method of application is too complicated. Then there is the matter of volatility. The danger of drift damage is ever present and the demands to overcome this problem are increasing. These are definitely problems for the trade people to consider. Control of

wild oats and toad flax are the two most pressing weed problems in Western Canada, while corn spurrey control and weed control in legume crops are very important in Eastern Canada. Herbicides are very potent weapons in the war against weeds and they can become increasingly beneficial."

#### Gains To The Farmer

**F**EATURED on the Friday afternoon, October 29th, program was a symposium in which four speakers discussed "Gains to the Farmer Through Proper Use of Agricultural Chemicals." James Farquharson, president, Canadian Seed Growers Association, Ottawa, dealt with use of agricultural chemicals on grain. He said that western seed growers would welcome the development of an inexpensive herbicide for control of wild oats. He also warned that because our present herbicides do not control all weeds, the removal of competition by the killing of susceptible weeds tends to cause resistant weeds to become more of a problem. He said growers are hopeful that herbicide manufacturers will develop improved products which will control a wider range of weed species.

He also expressed the hope that the industry will be able to develop improved herbicides which will be less damaging to trees, shrubs and gardens adjacent to crop areas being treated. Recent research by Dr. John

(Continued on Page 113)

**R** EPORTS on insect control, disease control, herbicidal chemicals, fly control, the alfalfa weevil situation and tree fruit pests, outlining the proposed 1955 recommendations on pesticidal chemicals for New Jersey comprised the 1955 Annual Pesticide Dealer's Conference held November 18th at Rutgers University, New Brunswick, N. J. Dr. Leland G. Merrill, extension entomologist at the College of Agriculture, was in charge of the program which included reports by 13 members of the Rutgers College of Agriculture and N. J. Agricultural Experiment Station staff.

The nematode problem in New Jersey was among the soil pest problems considered by O. Starnes, N. J. Agricultural Experiment Station. Dr. Starnes pointed out the need for a survey which would show where soil pests are the greatest problem, what kind of pests are present and in what numbers. He indicated that all of the nematodes available are highly toxic to plants and that an important limitation is the necessity for using the fumigants under confined conditions.

Dr. Starnes reported that dichloro ethyl ether is good for wire worms in cabbage, broccoli, cauliflower, etc. and would be recommended for 1955. He advised that among the best products for field use at this time are the dichloro propene propane mixtures.

#### Tree Fruit Pests

1954 Research results on the control of tree fruit pests were considered by R. H. Daines, Department of Plant Pathology, and Byrley F. Driggers, Department of Entomology. Dr. Daines pointed out that powdery mildew was not a commercial grower's problem in New Jersey until recently. This disease, he said, was particularly destructive however in the orchards of several states adjacent to New Jersey and has recently been observed in some N. J. orchards. He indicated that a wettable sulfur program should be adequate to hold powdery mildew in check.

The use of antibiotics for control of fire blight was considered in an-

other phase of Dr. Daines' report. He advised that although several investigators have reported control of fire blight in apples by the use of bloom sprays of streptomycin, or combinations of streptomycin and terramycin, more information is required before these materials can be officially recommended for commercial use.

Dr. Daines also discussed studies on control of peach canker and the apple spray program. Peach canker can occur at any time of the year, he stated, although the principal infection periods are fall and spring. The carbamates, Phygon or Captan are suggested for most effective control; and it is cautioned that Phygon should not be used with Captan.

Dr. Daines reported there is evidence that phenyl mercury fungicides, used at full strength, may reduce yields. As a result, it is suggested that a phenyl mercury fungicide, at full strength, be used only as an emergency measure. Captan has performed most consistently and is recommended for use against apple scab, frog eye leaf spot, Brooks' fruit spot, bitter rot, black rot, etc; however, this fungicide has shown a weakness in the control of cedar rust, sooty blotch and fly speck. It is cautioned that Captan not be used with lime, lime-sulfur, wettable sulfur or oil. Lime or lime-sulfur will destroy the fungicidal capacity of Captan, while wettable sulfur or oil used with this fungicide may result in foliage injury.

Dr. Driggers reported that the major changes in the apple spraying recommendations for 1955 are: (1) that DN-289 and Elgetol 318 as well as dinitrocresol compounds be used in the strict dormant stage; (2) oil be omitted in the delayed dormant if DN-289 or Elgetol 318 is used as a dormant spray; (3) Ovex at  $\frac{1}{4}$  lb 50% wettable powder in 100 gals of spray mixture be used in addition to TEPP for mite control during the pink bud period; and (4) to control codling moth, the amount of DDT is increased from  $1\frac{1}{2}$  lbs to 2 lbs of 50% wettable powder in the 2nd and 3rd cover sprays.

# 1955

Dr. Arthur J. Farley, Pomology Extension, advised that in the program to control European red mite Aramite may not offer too good control under cold, wet conditions; that Ovex offers better control early in season rather than late in season; and that chlorobenzilate is reasonably safe on all varieties of apples. Dr. Farley reported also that where the lead arsenate-fungicide spray is not adequate for plum curculio control, addition of methoxychlor or dieldrin will improve control of this disease. Ferbam, Zineb or Glyodin are effective in control of sooty blotch and late scab.

#### Herbicides in Review

**D** ONALD Shallock, Farm Crops Extension, summarized some of the research on herbicides, reporting that good results have been obtained in the use of dinitros on seedling alfalfa to control chickweed. (The 1955 recommendations suggest 1 lb. in 20-40 gals soln.) In a discussion of chemicals studied for the control of nutgrass, Mr. Shallock reported that amino triazol has been effective at low rates if followed with disking and a cover crop, and if applied in two sprays when crop is  $2\frac{1}{2}$ - $3\frac{1}{2}$  inches high. He reported also that although nothing has been released on the use of trichlorobenzoic acid, studies thus far show that the compound does not harm corn and does kill weeds.

Another compound, 3,4-D, used up to 1 lb. has not been injurious to

#### AGRICULTURAL CHEMICALS

*New Jersey*

# Pesticide Recommendations

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Pesticide Dealers Attracts 100*

alfalfa (although it does injure red clover at this dosage), and has been found to kill mustard at  $\frac{1}{4}$  lb. dosage. 2,4,5-T has no residual action and is effective in control of horsenettle; however, it should be used only where susceptible crops are not present, and cannot be used as yet on any legumes. None of these chemicals are mentioned in the 1955 recommendations, as they are still under investigation. Mr. Shallock reported also that Dalapon promises to be effective in use on Bermuda grass, and nutgrass.

## Vegetable Pests, Diseases

**T**HE spittlebug is still the major pest of hay crops, the conference was told by R. S. Filmer, Department of Entomology, in a discussion of hay crop insect control. Endrin, he reported, will control alfalfa weevil and will also have some effect on spittlebug. Lindane is the best choice for pea aphid, and will also control spittlebug and alfalfa weevil. Methoxychlor does not give satisfactory control; and heptachlor, although fair on spittlebug and offering good control of alfalfa weevil, has no effect on pea aphid and causes some off flavor in roots.

Dr. L. C. Merrill, Jr., Entomology Extension, reported that 2% wettable malathion is effective in reducing the incidence of sap beetles on corn.

Investigations of fungicides for disease control in vegetable crops and potatoes were reported by B. H. Davis, Department of Plant Path-

ology. According to Dr. Davis, the carbamates offer good control of anthracnose, but when late blight is severe, copper compounds should be used. He reported also that streptomycin nitrate has been tried for the control of bacterial leaf spot in peppers. Although it appears to offer control of this disease, the economics are not yet determined. Dr. Davis reported also that a spreader-sticker is not necessary for use with Maneb, Zineb, or Ferbam.

## Small Fruit Problems

**T**HE use of insecticides on blueberries and cranberries was discussed by P. Marucci, Department of Entomology, and E. Varney, USDA. Mr. Marucci indicated that rotenone is effective in the control of blueberry maggot, which is the chief pest of this fruit. He reports also that malathion and DDT are substitutes for parathion in cherry fruit worm control, and that methoxychlor is ineffective against blueberry pests.

Dr. Varney advised that sprays of 3 lbs. ferbam or ziram; or 2 lbs. of zineb or maneb are effective in the control of fungus fruit rots. He indicated also that parathion or DDT should not be added to these sprays during bloom, because bees are sensitive to these chemicals.

## Fly Control Recommendations

**A** DISCUSSION of fly control on farms and on animals was led by Dr. Elton J. Hansens, Department of Entomology, who reported

that diazinon may be approved for use in dairy barns by the summer of 1955. Dr. Hansens also pointed out that there are many places where DDT, methoxychlor, or lindane-resistant flies do not exist, and where these materials will give best and cheapest control. In connection with the use of insecticides on cattle, Dr. Hansens advised that rotenone is the compound recommended for cattle grubs, and that methoxychlor is preferred for dairy cattle, although rotenone and pyrethrum can also be used. He reported that chlorinated insecticides are effective in the control of lice on poultry.★★

## PEPS for Banana Stem Rot

Researchers at the B. F. Goodrich Research Center recently announced that tests proved that the fungicidal paint containing Good-rite p.e.p.s (polyethylene polysulphide), prevents stem rot. They reported that growers had for some time been using the material to paint a rubbery film on the ends of whole stalks of bananas after cutting from the tree. However, they were reluctant to apply the chemical to the stems of freshly cut bunches for fear that the fungicide would migrate into the edible portion of the fruit. However, experiments conducted in the B. F. Goodrich laboratories proved that the fungicide does not migrate from the point of application, and therefore can be safely painted on the stems prior to shipment.

**Discussions on fertilizers, herbicides,  
highlight 46th annual conference of**

## **The American Society of**

**T**HE 46th annual meeting of the American Society of Agronomy was held in St. Paul, Minnesota, November 8-12. The meeting featured a series of several hundred papers with a high percentage of them being on fertilizer subjects, and others on herbicides.

Professor C. J. Willard of Ohio State University delivered the presidential address before the group November 10 discussing "Weed Control: Past, Present, Prospects". Progress in weed control has been slow, he commented, in comparison with progress in insect and plant disease control because it has not been easy to develop chemicals that would kill weeds without harming crops. Within recent years, however, researchers in the herbicide field have developed new products by the thousands and many of these have shown sufficient promise so that weed control experts now have dozens of new products to test. Millions of acres are being treated in all parts of the country and Professor Willard estimated that in 1952 9½ million acres of corn and almost 18 million acres of small grain were sprayed for weed control in the U. S.

Professor Willard cited control for woody plants as "the most important single aspect of this revolution in weed control". He warned, however, that chemical weed control must always be considered as a supplement to, rather than a substitute for cultural methods. Any selective weed killer, he cautioned, will almost always fail to kill some weeds. If cultural methods are not employed to get the weeds which the chemical does not kill, these weeds will reproduce and before long become dominant. He

added that it is possible that many weeds may develop resistant strains just as strains of insects resistant to various insecticides have been produced. Two areas of progress cited by Professor Willard are applications of herbicides to the soil after the crop seed is planted, but before it emerges, and soil sterilants. One of the most difficult fields, requiring much more research, is that of aquatic weeds.

For the future he indicated his belief that herbicides will tend more and more to be specialties because of the specificity of most of the chemical agents employed. "This tendency toward a continually increasing number of herbicides", he said "is a perpetual headache to the manufacturers, but I do not see how they can avoid it".

### **Fall Fertilizer Application Urged**

**I**N the plant nutrient section, a series of papers was delivered concerned with seasonal application of fertilizer. William F. Price, general sales manager for the plant food division of Swift & Company, Chicago, reported that the application of fertilizer by farmers during the fall season offers opportunity for lowered farm costs. Currently about 70 per cent of fertilizer is applied in the first months of the year and only 30 per cent in the last six months. Experimental programs in a number of states, however, indicate good possibilities ahead for increased fall application of fertilizer. If production can be spread on a more even basis, Mr. Price suggested, plant capacities can be employed more economically and sales expenses reduced. The net result would be a reduction in the cost

of doing business that would rapidly be reflected in lower fertilizer prices to the farmer.

Documenting this general theme, Clifton Halsey and J. M. MacGregor of the University of Minnesota reported on "A Comparison of Yields of Corn, Oats, Wheat and Hay Resulting from Fall and Spring Applications of Fertilizers". On the basis of tests over a three year period they found that fertilizers can be applied just as well in the fall as in the spring. Yields of corn, oats and hay proved to be equally good from either period of application. Increases in yields on all crops were about the same no matter when the fertilizer was applied.

John Pesek of Iowa State College, in another contribution on seasonal application of fertilizer, noted that one way to increase fertilizer consumption in the corn belt is to extend the period during which it can be applied for immediate crop use. This means the application of fertilizers in late summer, fall and winter for corn, oats or soybeans the following year.

W. B. Andrews of Mississippi Agricultural Experiment Station reported that an examination of a great deal of information from the south-east shows that, by and large, most fertilizers should be applied relatively close to the time of use by crops. In the case of small grains planted in the fall in the south, he advised, any phosphate used should be applied in contact with the drilled seed. Where the seed and fertilizer are broadcast, application of phosphates one month before planting proved to be much less effective than at-planting application. Nitrogen proved to be most effective on small grain when applied



# Agronomy

in the early spring, though anhydrous ammonia may be applied in the late fall on soils more acid than pH 5.0. Applications of nitrogen have not been effective for summer pastures when weather was dry, except on low, wet soils. In order for nitrogen to be effective on most pastures in most years, it is necessary for it to be present during the spring months when moisture is plentiful.

## What Happens To Phosphate?

**J.** A. Kittrick and M. L. Jackson of the University of Wisconsin reported details of their research work on what happens to phosphate in the soil. Only a small amount of phosphate fertilizer finds its way into the crop during the season, they pointed out. Most of the phosphate reacts with the soil itself, forming insoluble crystals. Even though much of the phosphate is tied up in the crystals, these researchers noted, the relatively small percentage used by the plants brings a sufficient increase in crop yield to give a good return on the fertilizer investment and, they added, the phosphate in the crystals remains slowly available to the crop and thus eventually gives some additional return. Research is still under way to find methods to increase the availability of phosphorus fertilizer through liming and other soil management practices.

"It takes a rather acid soil to make the phosphorus in rock phosphate available to plants" it was reported by Roscoe Ellis, Jr., M. A. Quader and Emil Truog of University of Wisconsin. They recommended strongly that where rock phosphate is to be used, it should be

put on the fields at least before the liming operation. In tests conducted with oats growing in pots of acid silt loam subsoil they found that when they mixed rock phosphate with the soil first, then applied lime a month later, the oats grew much better and took up more phosphorus than when the lime was applied before the rock phosphate. They concluded that farmers using rock phosphate won't get much good out of it unless their soil is acid. They suggested that it would be much wiser to use superphosphate in growing crops such as alfalfa or other crops that need a non-acid soil—even though it costs more per ton—and to lime the field.

Other experiments confirming the superiority of ordinary superphosphate, concentrated superphosphate, calcium metaphosphate, fused tricalcium and liquid phosphoric acid over rock phosphate were reported by A. C. Caldwell and F. L. Hammers and Andrew Hustrulid of University of Minnesota. Available phosphate in the soil, they noted, was greater, sometimes 100 per cent or more, in the plots receiving these materials as compared with those receiving no fertilizer, or simply rock phosphate. Mixed legume hay showed consistent gains in yield over the entire period from those sources of fertilizer in which the phosphate was in available form.

"Applying too much fertilizer at one time to alfalfa fields doesn't pay," was the advice given by W. W. Nelson and J. M. MacGregor, making their first report on long term fertilization studies at the University of Minnesota's Agricultural Experiment Station at Rosemont. Their general conclusions were as follows: (1), heavy applications of phosphate alone produce large yield increases, however, including potash was necessary to get top yields and reduce winter killing. (2), fall or spring fertilization are equally successful. (3), second cutting alfalfa is highest in crude protein, phosphorus and potassium. (4), phosphate fertilization alone increases protein and phosphorus in alfalfa plants. However, when potash is included with the phosphate,

there is less protein and phosphorus, but more potassium in the plants. (5), the effect of nitrogen fertilizer on alfalfa is small and not worthwhile.

Reporting on a study of inclusion of trace elements in fertilizers in Minnesota, John F. Mulvehill and J. M. MacGregor of University of Minnesota found that trace elements such as boron, copper, manganese and zinc are not necessary in fertilizers for use in Minnesota today. The only exceptions might be for such high value crops as celery and rutabagas which have high trace element needs.

Fertilizer recommendations for the tobacco grower were contained in a paper by D. L. Myhre, O. J. Attoe and W. B. Ogden of University of Wisconsin. Sulfur and nitrogen in the leaf, as well as chlorine, tend to give poor burning tobacco but if the growing plant takes up enough potassium, the harmful effect of these elements is often overcome. These findings emphasize the importance of the tobacco grower using fertilizers with large amounts of potassium and as little chlorine and sulphur as possible. Enough nitrogen is needed to produce good growth and quality, but the amount applied must not be so large that it is detrimental to the burning qualities of the harvested tobacco leaf.

## Sufactants Boost Crop Yields

**K.** C. Berger and L. G. Nelson of the University of Wisconsin reported on experiments with the application of a surface active agent ("Ultrawet") to the soil to determine its effect on the yield of alfalfa, red beets, oats, corn, sugar beets, red clover, spinach, and canning peas. The average increase in yield of the crops was about 65%. Applications of the material were made at the rate of 25, 50, and 100 lbs. per acre to a Miami silt, loam soil. On other soils, yields of alfalfa brome hay were increased as much as 40%. All plots received adequate fertilization in addition to the surface active agent treatment. Cause of the yield increase has not yet been determined, but studies are underway to determine how consistent such increases are.

(Continued on Page 107)



## Eastern ESA Conference

**M**ORE than 50 papers dealing with pest control on vegetables, fruit, ornamentals, mite control, acaricides, etc., highlighted the annual Eastern Branch meeting of the Entomological Society of America, November 15-16, at the Hotel New Yorker, New York City. In the annual election of officers, members named E. H. Wheeler, Massachusetts Agricultural Experiment Station, as chairman of the branch for 1955, succeeding H. G. Walker, Pennsylvania Salt Manufacturing Co. F. W. Poos, USDA, Beltsville, Md., was elected vice-chairman, and B. F. Driggers, Rutgers Univ., New Brunswick, continues as secretary-treasurer.

H. H. Ross, president of the national ESA, gave the opening address, following an introductory report by chairman H. G. Walker. Mr. Ross discussed some of the objectives, accomplishments and problems of the ESA. Ashley B. Gurney, executive secretary of ESA, continued the discussion with a review of progress over recent years and an appraisal of future problems as the organization continues to grow.

E. C. Turner, Virginia Agricultural Experiment Station, Blacksburg, Va., reported on control of the clover root curculio, and indicated that heptachlor was effective in spring applications, but had not been tried in the fall. He reported also, that in general, all the insecticides tested showed good control in fall applications, except for toxaphene, which of-

fered only fair results. He emphasized that the tests were still only preliminary.

A paper on the "Control of the European Chafer in Meadows with Granulated Insecticides" by W. G. Evans, and G. G. Gyrisco, Cornell Univ., Ithaca, N. Y., indicated that aldrin, dieldrin and heptachlor gave good control of this pest. Used at 1 and 2 lbs. per acre the following per cent reductions in infestation were obtained for the respective insecticides: aldrin, 86.91.5; dieldrin, 94.95; heptachlor, 81.3, 87.7. Chlordane used at 10 lbs. per acre gave 85.5% reduction and toxaphene used at 10 and 20 lbs. per acre resulted in reductions of 46.8 and 52.3 per cent. Granular application of insecticides was reported to have given good results.

M. Semel, Long Island Vegetable Research Farm, Riverhead, L. I., discussed further investigations of systemic compounds for the control of the two-spotted mite on lima beans and advised that systox emulsions containing  $\frac{1}{2}$  or 1 pt. of 23% emulsifiable concentrate, or sprays containing one or two pts of a technical emulsion consisting of 90% of the active octamethyl pyro phosphoramidate per 100 gals of mixture, gave excellent control where foliage applications were made to coincide with mite build up. Such applications, he reported, were relatively ineffective on a seasonal basis. The level of demeton residues on shell beans might fall into

a safe range, Mr. Semel said, if tolerances are forthcoming. If necessary, he continued, concentrations of demeton could be halved, with probable reduced residue levels and only slightly reduced control.

Floyd F. Smith and Paul Giang, USDA, Beltsville, Md. presented a paper on malathion residues on vegetables and their reduction by washing, in which the following data was given:

Malathion Residues (PPM)			
Crop	Unwashed	1 Wash	2 Washes
beets			
dust	6.5		.2
emulsion	5.8		.2
wettable			
powder	11.5		.3
okra pods			
dust	3.3	.3	.2
wettable			
powder	3.4	.5	.2
wettable			
powder	7.7	1.4	.5
broccoli			
dust	9.3	.7	.6
emulsion	14.0	2.4	2.3
wettable			
powder	15.00	3.6	1.7

As indicated from the above data, kale, broccoli and lettuce offer the greatest problem in removing residues by washing.

Discussing insects attacking red clover in Rhode Island and their con-

## Nov. 15-16

Photos on facing page, top: B. F. Driggers, Rutgers Univ., New Brunswick, N. J., secretary-treasurer, H. G. Walker, Pennsylvania Salt Mfg. Co., Philadelphia, retiring chairman, E. H. Wheeler, Mass. Agr. Experiment Station, Amherst, Mass., newly elected chairman, and F. W. Poos, U.S.D.A., Beltsville, new vice-chairman.

Bottom Photo: Neely Turner, Conn. Agr. Experiment Station, chairman resolutions committee, M. M. Darley, General Chemical Co., New York, chairman program committee, Donald Mac Creary, University of Delaware, chairman auditing committee, and J. M. Grayson, Virginia Polytechnic Institute, chairman nominating committee.

trol, T. W. Kerr, University of Rhode Island, Kingston, R. I., indicated that some 23 species of insects were found in medium red clover, but that no clover root borer was found in this group. He reported also that investigations on the effects of insecticides on yield of medium red clover indicate that DDT, particularly, can have a definite influence, although this is not always recognized immediately.

L. P. Ditman, University of Maryland, College Park, Md., presented a report prepared in cooperation with F. P. Harrison on the relation of the variety factor to the control of earworms on sweet corn. The per cent differences between check and treated crop ranged from 30.4 to 57.9% in corn earworm infestation and 5.5 to 21.0% in sap beetle infestation with the different varieties of corn.

Investigations of in-the-row treatment for onion maggot control were reported by W. A. Rawlins and R. G. Strong, Cornell University, Ithaca. The following results on drench and spray application, respectively, of  $\frac{1}{4}$  pt of the following insecticides are given as per cent of injured plants: aldrin, 41.0, 54; hepta-

chlor, 12.0, 41.0; and parathion 53.0, 59.0

### European Red Mite Control

A SERIES of papers on fruit insects featured the Tuesday morning session, November 16th. B. F. Driggers of Rutgers University, New Brunswick, N. J. reported on experiments in the control of the European Red Mite on apples. He recalled that when parathion was first introduced, it was originally extremely effective in the control of European Red Mite even in relatively small doses. Soon, however, growers began to report that they were failing to get good control even when heavier dosages were used.

At the beginning of the 1953 season, it was decided by the Rutgers workers to shift their control efforts to the dormant stage. Ovotran proved superior to 2% oil in these tests, although later in the season Ovotran did not work as well as it did in the early season treatments.

In 1954 these studies were continued, comparing oil alone with oil plus Ovotran, two Ovotran sprays and various other materials. Oil alone was not particularly effective, but oil plus

Ovotran or the two Ovotran sprays gave good control. Among the other materials tested which proved effective were Chlorobenzilate, 1 lb., (Pink and Calyx). Also GC#923, 50% emulsion,  $1\frac{1}{2}$  pints (Pink and Calyx), and Aramite 15W (experimental),  $1\frac{1}{2}$  lbs. (Pink and Calyx). The experimental Aramite gave better results than regular Aramite. Through all of these tests, the phosphates as a group continued to be ineffective,—with plots receiving phosphate applications showing high mite populations.

Dean Asquith of the Pennsylvania Fruit Research Laboratory, Arendtsville, Pa. reported on acaricide tests on apples in 1954. Their studies indicated that a new product of Rohm & Haas Co., Philadelphia—FW#293 (25% wettable powder)—proved outstanding in the control which it afforded. Also effective were Aramite 15W and Aramite Experimental,—Aramite Experimental being superior to regular Aramite.

Reporting on "Preliminary Tests with Systox Against the Leafhopper Vector of Cranberry False-blossom" Martin T. Hutchinson, Rutgers University indicated that in recent tests systox was found to be effective for as long as four months after application.

Donald E. Ullrich, Cornell University reported on "Residues and Toxicity of Malathion on McIntosh Apples". In three seasons of residue studies (1951, '52, '53) it was found that addition of lime to malathion impairs its toxicity seriously. Adding lime to the spray mix was found to reduce the deposit of malathion substantially. Malathion was disclosed in other studies to be quite phytotoxic to fruit. Injury resulted from application of malathion in all three concentrations tested—50%, 57% and 81% emulsions—and at all stages of development. Most injury was found to occur on the lower limbs of the test trees.

E. H. Glass of the New York State Agricultural Experiment Station, Geneva, New York, reported on "Unsatisfactory Codling Moth Control with DDT in Western New York". For the last two or three sea-

sons an increasing number of reports have been received of lowered control of codling moth with DDT applications. It is becoming increasingly apparent that there are strains of codling moth definitely resistant to DDT. The first such strains were noted in Ohio, and in the past two seasons several examples of resistant strains have also been reported from orchards in Niagara County, New York State. In spite of increased number of sprays and increasing concentrations of DDT, lowered control still resulted. Parathion and diazinon, on the other hand, gave good control in these same areas. It was the conclusion of New York State Experiment Station workers, said Dr. Glass, that while reduction in control with DDT is still moderate, we are apparently definitely in the initial stages of development of resistance, at least in these particular orchards.

A series of papers at this session also dealt with experimental results on various materials used for fly control. Warren T. Johnson, University of Maryland, College Park, Md. reported on "Tests with Organic Phosphate Insecticides for Fly Control". He indicated that malathion, 4124, chlorthion and diazinon all gave good control of flies when used in liquid baits. Malathion, diazinon, and #L13/59 gave good results as dry baits—however initial kill was not as rapid. Malathion, diazinon and 4124 were the best of the wall sprays. They were effective for three or more weeks. Both baits and wall spray formulations gave good fly control. Method of application, he indicated, will probably depend largely on the economics of each particular situation.

E. J. Hansens of Rutgers University, New Brunswick, reported on results of "Fly Control in Dairy Barns in 1954". This past season lindane-resistant flies were still being encountered. Also, a new fly problem, the species—*Fannia*—was encountered this year, which proved more difficult to control. *Fannia* tend to hover and are thus much less susceptible to control by residual sprays.

Of the residual materials tested,

4124 was the best of the lot—giving satisfactory control for 40-60 days. Chlorthion also gave good results, providing satisfactory control for three to five weeks. Methoxychlor was next in the table of effectiveness, followed by malathion and by lindane—the latter of which gave definitely inferior results the past season.

In tests on dry baits, diazinon showed up very well. Pirazinon also gave rather good control, but not as good as diazinon. New Calcite baits tested this season also performed satisfactory, as did chlorthion. Diazinon tested in wet baits gave excellent results.

Residual sprays were considered superior to baits since they gave control for a longer period. Also they were effective against a wider variety of flies including *Fannia*. Baits are recommended by these researchers merely as supplementary control.

Roger Scott of Geigy Chemical Co. reported on "Diazinon and Pirazinon in Fly Control." He recalled that in previous seasons diazinon had shown promise against flies which had developed resistance to chlorinated hydrocarbon sprays and also that pirazinon in the previous season's work had looked good against houseflies. In 1954 no particularly significant results resulted from tests of the different formulations. Little difference was noted between 1% and ½% diazinon. Emulsifiable and wettable powders gave similar results. Addition of sugar or methoxychlor to the diazinon did not enhance control. Both pirazinon and diazinon gave about equal results. The researchers considered that perhaps the presence of *Fannia* and the long spells of hot, dry weather interfered with test work.

The resolutions committee headed by Dr. Neely Turner of the Connecticut Agricultural Experiment Station presented a resolution which was acted on favorably, to the effect that at future meetings those preparing papers for presentation should be asked to submit an abstract of the paper to the program committee. Favorable action was also taken on a resolution suggesting that a new committee be named to assist entomologists in get-

ting jobs in the profession.

A dramatic account of a battle against a gypsy moth infestation in Michigan last summer highlighted the closing session of the ESA meeting.

W. V. O'Dell, of the USDA at Greenfield, Mass., described the part he played in assisting the state of Michigan during an emergency created by the insect in May. Although the gypsy moth is limited mainly to the New England area, having been introduced there in 1869, it has appeared in isolated areas in the Midwest, most notably in Michigan.

When the outbreak was noted, Dr. O'Dell was called to the scene to help direct the control measures against the insect that was causing widespread damage to trees and shrubs in the state. In outlining the program set up to combat the moths, Dr. O'Dell praised the flexibility of the Michigan legislature, which permitted rapid initiation of the program, without waiting for a formal legislative session.

A meeting of the state's "little legislature", consisting of high state officers and the governor, was called and funds for purchase of insecticides and their application were granted.

A spray company from Yakima, Wash. was awarded the job on the basis of bids received, and swung into action immediately. Using a converted B-29 bomber and two smaller planes, the sprayers covered the entire urban and farm area infested by the gypsy moth in five days. Approximately 59,000 gallons of a DDT emulsion were used for the job, which brought excellent results, according to the speaker.

In other talks at the Tuesday afternoon session, the following comments were made:

E. L. Gambrell, New York State Experiment Station, said chlordane, lindane and several other pesticides gave good control against the European Chafer, while DDT was less effective for the job.

Good control against two species of aphids and three species of scale insects on ornamentals was obtained

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## U.S.D.A. Offers Regulations for CERTIFICATION of PESTICIDES

THE U. S. Department of Agriculture released on November 24th the draft of its proposed regulations to be followed in obtaining certification of usefulness of pesticide chemicals under the new Miller Amendment to the Federal Food, Drug and Cosmetic Act. It is under the recently amended act (Public Law 518) that any new applications for establishment of residue tolerances for pesticide chemicals on food-stuffs will be acted upon.

Some tolerances have already been proposed (*Agricultural Chemicals*, Nov., 1954, pgs. 60-61) based on testimony taken at the hearings held by the U. S. Food and Drug Administration in 1950, but for any future tolerances, or for resubmission of materials previously ruled upon, on which new data is now offered to secure a change in the present tolerance, it will be necessary to proceed under the terms of the Miller Amendment to the Federal Food, Drug and Cosmetic Act.

The USDA announcement of November 24th outlines the following procedure to be followed where it is desired to have a tolerance established:

1. Filing a petition proposing the tolerance, together with supporting scientific data to establish safe residue levels, with the Secretary of Health, Education, and Welfare (Administrator of the Food, Drug, and Cosmetic Act).

2. Filing with the Secretary of Agriculture a copy of the petition and a request to certify to the Secretary, HEW, that the pesticide chemical is useful for its intended purpose and that the requested tolerance reasonably reflects the amount of residue, if any, likely to result when the pesticide is used as proposed.

The complete proposals for certification procedure were published in the *Federal Register*, November 24th. They include the following principal requirements:

- a. Requests for certification (see 2, above) should be made in

writing to the Chief, Plant Pest Control Branch, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C. Certification should be asked for, only on economic poisons that have been registered or submitted to USDA for registration as pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. These requests must be accompanied by a copy of the petition for tolerance that has been submitted to the Secretary, HEW (See 1, above).

- b. Requests for certification should be supported by reports of all experimental work demonstrating the effectiveness and usefulness of the pesticide. These data, plus any other available information about the pesticide, serve as a basis for USDA's certification decision.

- c. If for any reason certification is not justified in all respects, the applicant will be so informed by registered mail. Within a week after receipt of notification, the applicant can file a request with the Chief, Plant Pest Control Branch, for (1) certification to the extent proposed by USDA; (2) a hearing on the proposed certification or the parts objected to; (3) both such certification and a hearing; or (4) withdrawal of the request for certification.

As with all such government regulations on procedure, this proposed procedure too is subject to debate. It is provided that interested persons can submit written arguments on the proposed procedure to the Chief, Plant Pest Control Branch, U. S. Department of Agriculture, Washington, 25, D. C., within thirty days of publication of the notice in the *Federal Register* (i.e. up to December 24th).

### NAC Reviews Proposal

AT the annual meeting of the National Agricultural Chemicals Association held in Spring Lake, N. J., last September, questions from the industry on "How To Operate Under The Miller Pesticide Amendment" were answered by members of a panel. Members of the panel were: L. S. Hitchner, secretary of N.A.C.A., presiding; William W. Goodrich, assistant general counsel, Food & Drug

Division, Department of Health, Education and Welfare, USDA; John T. Coyne, assistant head, Pesticide Regulation Section, Plant Pest Control Branch, Agricultural Research Service, USDA; John D. Conner, NAC counsel; and Joseph Noone, NAC technical adviser. Although this panel discussion has previously been reported in *Agricultural Chemicals*, (October, 1954, pgs. 36-44) some of the questions and answers are reprinted here for the guidance of industry members in proceeding under the new regulations.

Question: If you have a product that leaves no residue, then what would be the case?

MR. COYNE: If he submits to the Department of Agriculture a request to register a product under the FIFRA, but does not file a petition for a tolerance under P.L. 518, and if the data submitted proves absence of residue, and the Department of Agriculture takes no exception to the data, the Department will proceed to consider the product for registration under the FIFRA, without referring the data to the Food and Drug Administration. Under these circumstances, he has presumably determined that a tolerance or exemption is not necessary, so he has not filed a petition with Food and Drug, and hence, the procedures established by P. L. 518 are not applicable.

Question: Just what action should a company be prepared to take after the proposed tolerances are announced?

MR. GOODRICH: Usually you ought to be prepared either to go forward with your objections or be satisfied with what you get. If you are ready to go forward with your objections you have to call your lawyer.

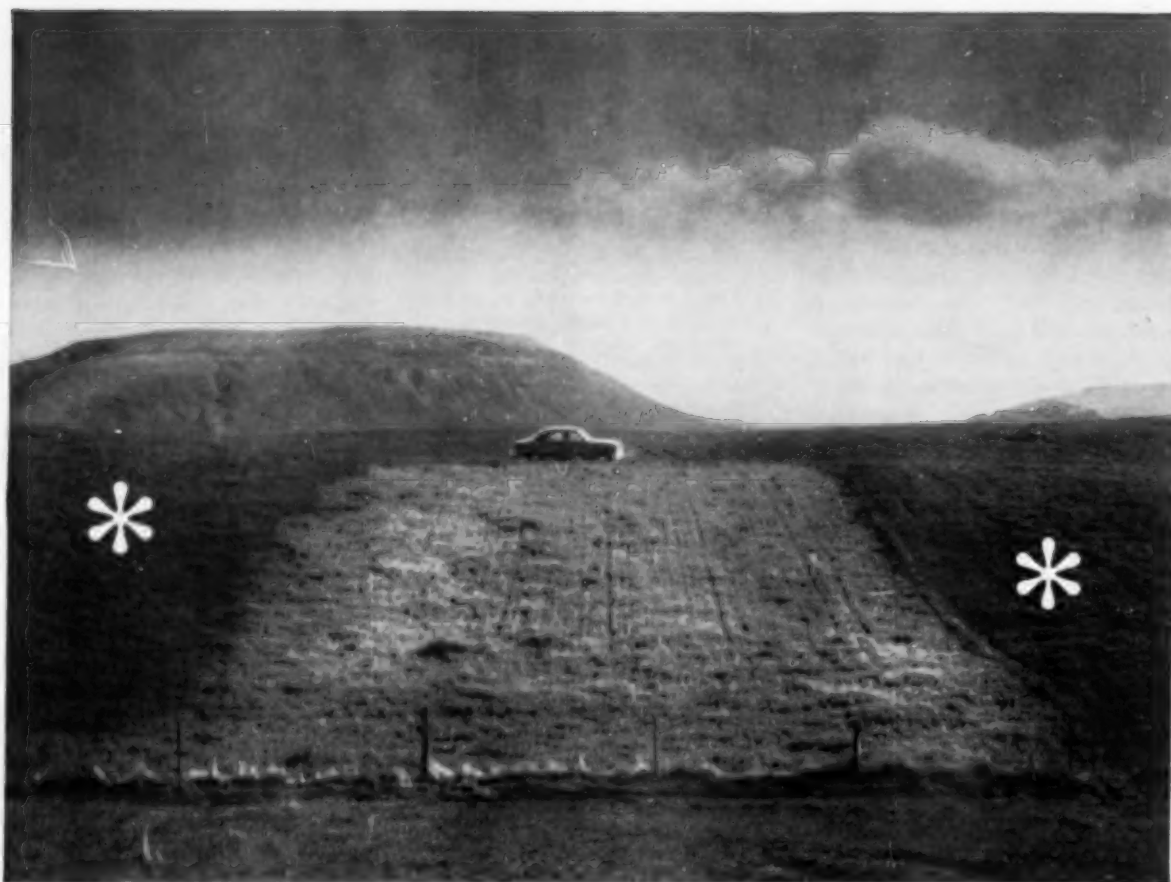
Our experience under the new drug application business, which is very similar, has been that where discrepancies have come up every effort has been made between our people and the applicant to try to iron them all out before they call in the lawyers. I expect that will be the experience under this law. The tolerance is effective when announced and you either must object or try to live with it.

Question: In certifying the effectiveness or usefulness of agricultural chemicals, what consideration will be given to the performance of competitive materials?

MR. COYNE: We'll regard as a standard what is generally accepted as adequate control agriculturally, over the years' agricultural experience. However, each specific petition, as far as certification of usefulness, will have to be regarded on its own merits. That is, the ultimate determination as to whether a particular petition is certified for usefulness or useful for some purposes, or negatively certified will be done individually.

Question: From a practical standpoint if a zero tolerance is set, does that

(Continued on Page 107)



## *\*Moly* MAKES NITROGEN WORK

Alfalfa, clover, and other legumes need traces of molybdenum in order to fix nitrogen. When "moly" is lacking in the soil, legumes cannot make use of atmospheric nitrogen . . . crops are stunted and pale . . . stands are hard to establish, often dying out quickly.

Treatment of deficient soils with a few ounces of a moly chemical per acre has increased yields up to six times.

Try it for yourself—make a molybdenum trial on poor pasture and legume stands. Moly can be applied by mixing with fertilizers, as a spray, or as a seed treatment. Write for our bulletin "Testing for Molybdenum Deficiency." Dept. 43, Climax Molybdenum Co., 500 Fifth Ave., N. Y. 36, N. Y.

### learn why, first hand:

**A little moly in each  
ton of fertilizer is  
BIG crop insurance.**

This advertisement is printed in one shade of molybdenum orange, a pigment widely used for its striking color and good coverage—ideal in print for farm and field equipment.

### Here's how the test was made:

1. Location: Property of M. L. Roberts, Waitaki County, New Zealand.
2. History: Alfalfa sown in 1948-1949 season. Limestone applied at rate of 1 ton per acre at time of sowing. Superphosphate applied twice before test without noticeable effect.
3. Soil type: Kauru silt loam, a poor slowly weathering soil of sandstone origin.
4. Soil conditions: pH 5.9. Exchangeable calcium high, potash very high, phosphate adequate, limestone required in maintenance quantities only. Available molybdenum (Griggs method) 0.09 ppm.
5. Test conditions: Sodium molybdate in water solution sprayed on side areas in December, 1951, at rate of 2½ ounces an acre. Side areas resprayed at same rate August, 1953.
6. Results: Above photograph taken October 30, 1953 shows increase in yield estimated at 500%. Pale center area was not sprayed.

# CLIMAX MOLYBDENUM

# Chelates



## In Plant Nutrition

By Eugene McCauliff

Glyco Products Co.  
Brooklyn, New York

**S**YMPTOMS of iron chlorosis in plants may readily be compensated by application of iron complexes to correct this deficiency. However, there are other factors to be considered in application of these chelates. On some plants it is necessary that applications be made directly to the soil rather than as foliage sprays, to prevent burning of fruit or blossoms; still another point is the determination of dosage to avoid plant injury.

Soil conditions pose still a third problem, since chlorosis in alkaline soils requires special treatment. A number of methods have been tried to date, and some have been successful under certain conditions. Further investigations are required, however, and these are continuing at the various agricultural experiment stations. Tests with an aqueous solution of a new experimental\* iron chelate containing 1.3 per cent of iron (expressed as metal) has been found satisfactory in some soils having a pH as high as 8.5.

Recommended dosages on citrus trees may vary with the size and age of the tree, local conditions, etc. but an average treatment of 1/3 pound of iron complex per citrus tree as a soil application has proved highly successful. Commercial chelates include Sequestrene<sup>1</sup>, Tetrine<sup>2</sup>, Nullapon<sup>3</sup>, Versene<sup>4</sup>. The average cost of

treatment per citrus tree is about 25 cents.

In vegetable crops the suggested treatment is 1 lb. of iron complex dissolved in 100 gallons of water per acre, as a foliage spray. At this level, there has been no evidence of any damage to plants in any of the treatments so far applied. In order to be on the safe side, however, the chelate sprays should preferably be applied during the middle third of the growing season to avoid injury to the marketable crop at or near harvest. Foliage spray applications have so far been confined to crops in blossom or in fruit. There is preliminary evidence that blossoms have been injured by such sprays, even in cases where the leaves were not harmed at higher concentrations than those given above. An interesting observation in the investigations to date, using different methods of application, is that young plants appear to take higher dosages without injury than do older plants.

As mentioned earlier, soil treatment can be used just as readily as foliage sprays, and should be employed where there is danger of injury to fruit or plant.

Crops responding favorably thus far to iron chelate treatments include avocados, pineapples, bananas in Hawaii, pear trees, celery, cabbage, mustard greens, grasses, herbs, vegetables, ornamental trees and flowers.

From a technical standpoint, the use of chelates offers more than a means of transforming metals to a form readily acceptable by plants. It

is not yet definitely known whether the iron complex is taken up by plant roots as a molecule, or if only the iron is absorbed and translocated. The process does, however, provide an acceptable explanation for the control of metals in transportation, absorption and assimilation in the bodies of plants and the microstructure of the soil.

The organic acids and proteins found normally in living protoplasm serve as natural chelating agents in the synthesis of enzymes, vitamins and chlorophyll. Intensive cultivation and overcropping of agricultural lands in many parts of the world however will eventually result in the depletion of humus, the source of natural chelating agents in the soil; and it will be absolutely essential that these starved soils be replenished with the necessary nutrients. On this basis, it would appear quite logical that regular fertilizer practice should include some amount of synthetic chelating agent to supplement the functions of natural humus.

Since chlorosis occurs in nearly all types of trees, shrubs, flowers, vegetables, grains and grasses in all parts of the United States, and indeed of the world, it is a serious economic problem. By removing or controlling  
(Continued on Page 109)

\*Ferralkine, LS, a 10% solution of a Tetrine. Product of Glyco Products, Co., Brooklyn, N.Y.

1. Sequestrene (R). Brand name for chelating compounds sold by Geigy Chemical Corp., New York.  
2. Trade mark for the iron chelates of the sodium salt of ethylenediamine tetraacetic acid, produced by Glyco Products Co., Brooklyn, New York.  
3. Nullapon (R) . . . Product of Antara Chemicals, New York.  
4. Versene (R) . . . Product of Versenes, Inc., Framingham, Mass.

## WASHINGTON

# Report

by

**Donald G. Lerch**

Cornwell, Inc., Washington, D. C.  
(Agricultural Chemicals Washington Correspondent)

**T**HE special committee guiding the implementation of the fertilizer Association consolidation has an opportunity to weld an organization of superlative value to the industry. The National Fertilizer Association and the American Plant Food Council are both conducting constructive programs for the industry.

For years the writer has had the opportunity of working with both associations in the preparation of information for his column and on other matters. The genuine interest and enthusiasm on the part of the staffs of both groups is outstanding. It would be difficult to find trade associations that were more dedicated to their purposes than these two.

Thus, the consolidation committee has a much easier task than would be normally expected. There has been a friendly competition between the two organizations. The competition has been more in gaining the end, than in the means of doing it. Each has its own set of activities and a concerted effort has been made to avoid duplication.

Because of the great stake in an orderly consolidation, we shall not attempt to list those activities which seem to be the property of either one or the other organization. Rather, we report that the general feeling here in Washington is that the move is being handled with diplomacy and that the results will be in the best interest of the industry and those associated with it. We look forward to our relationship with the National Plant Food Institute which is scheduled to become an organization this

coming July. Birth is not without pain, and we recognize there will be problems, but from the high caliber of the personnel dealing with them, we know the results will be constructive.

Deadline for filing of briefs on residue tolerances expires within the next few days. (December 20th) It appears, however, that the proposals are meeting with general acceptance by industry and agriculture. This does not eliminate possible objections by any company or segment of the industry. There is certainly no uproar, however.

This is a tribute to all those who have been and who still are a party to the procedures. It is evidence that there has been a general meeting of the minds on basic issues and that the policy for future operation is acceptable. The big job next year will be education—to follow through with agricultural authorities particularly in agricultural experiment stations so that farmers will have full information on the legal requirements connected with pest control. NAC and industry members have an important role. The successful application of the agreements and regulations now being adopted depends largely on the success of the educational work.

The recent Kansas City meeting of those interested in grain sanitation shows the continued interest in this field. Reports of various developments should be forthcoming shortly.

On the face of it, the mounting

stockpiles of grain pose a serious problem for both industry and government. It is hoped that progress will be speeded.

Scientists at the Coastal Plains Research Station, Tifton, Georgia are hard at work on residue studies of forage crops. This includes hay, pastures, and legumes. The new chemistry laboratory is expected to be in operation shortly after the first of the year.

This special residue study began in July of this year. As with most things, it takes time to get started. Work is now underway, however, and it can be assumed that it will have a bearing on possible future residue tolerances. E. W. Beck is the USDA scientist in charge.

The ring of cash registers at the "foreign trade counters" is growing louder. Some think it is due to swell even more. During the past several months exports of farm commodities have increased. You'll recall that farm exports plunged severely after the European famine, and recovered only slightly during the Korean conflict. During the long stalemate over truce negotiations, farm exports crashed again. Few thought there was much chance for the trend to change barring war or the threat of major conflict.

But it has happened. During the last half of this year, exports of farm commodities have increased in some cases 5% over the same period a year ago. What's more, the USDA says the outlook for exports is brighter in 1955. Other nations have more dollars to spend. Foreign stocks of some products, particularly cotton, are lower than last year.

Increased buying of cotton, tobacco, and wheat are expected. Total farm exports in 1954-55 may be up a tenth or more from the low level of \$2.9 billion in the previous crop year.

One of the reasons why this is considered to have significance is that food is the last thing other countries buy in the U. S. . . if there is any chance they can get it elsewhere. Reason is that when there is a short-



age of dollars these countries like to spend their money for machinery and industrial items they can't find in other countries which equal the standards in the U. S.

The fact that food sales are up shows some loosening in the amount of U. S. dollars in the hands of other nations. It also shows the result of taking other nation's money instead of U. S. dollars. It points up the hard work on the part of a lot of people to recapture some of the markets we have lost since the late 40's.

The outlook for general business in the export field is considered even better than for the farmer. The economic recovery abroad is believed to be expanding the demand for our industrial production.

Secretary of Commerce Weeks is pushing his agency farther into the foreign trade scramble with big plans for the international trade fairs. He feels that trade fairs are of major importance as market and show places for the world's goods.

Foreign buyers have been accustomed to seeking and finding sellers at international trade fairs because so many of them can be contacted in a short time in one place. Attendance at fairs frequently ranges from one to several millions.

Over 100 American firms are taking part in the Bangkok Constitutional Fair opening December 7. The exhibits will carry out the theme "Fruits of Freedom." During the coming year it is planned to participate in some 30 trade fairs.

It is hoped that this technique will bolster American export sales and add to the 4 million jobs which are already maintained by overseas trade. The Commerce Department has sent a consultation mission to the Bangkok Fair to advise and assist American sales representatives and prospective foreign buyers and sellers.

Secretary Weeks is putting experienced men at the center of this intensified operation with the appointments of Samuel W. Anderson as Assistant Secretary for International Affairs, and Roy F. Williams, Boston industrialist as a con-

sultant. Don D. Canfield, of New York will be stationed in that city to speed the program by offering special help to firms in the area. He previously served the Department of Commerce as a trade fair consultant, aiding in the presentation of the successful government-sponsored exhibits in Berlin and Izmir, Turkey, in 1952.

Look for stepped-up activity on behalf of the pesticide industry by the Foreign Trade Committee of NAC. Chairman James M. Merritt and NAC executive secretary Lea S. Hitchner are reviewing industry problems and opportunities. Quality and market potential are among the items receiving much attention. Where it is not possible to increase sales to certain countries, there may be more U. S. dollars invested in plants abroad. This appears to be a likely solution in certain instances.

## Thru the Sifter

**F**ACTORY-compounded vegetables are visualized by the author of an interesting article "Will Your Grandchildren Go Hungry?" in the October 23rd issue of the Saturday Evening Post. Industrial "farming" of the sea is held out as a logical and practical future prospect,—with the crop something like *chlorella pyrenoidosa*, an amazingly rich and productive one-celled edible alga which yields as much as fifteen tons dry weight per acre of water, as contrasted with corn's three tons per acre.

The next step in our fishery program, it is predicted, may well be the "development of great salt water 'ranches' where fish would be produced in great quantities, much as we raise livestock on land. These establishments would be located in estuaries where the water could be fenced into fields which would be fertilized to promote growth of sea plants, and stocked with the most efficient types of fish." At regular intervals the salt-water livestock would be harvested.

Dr. K. Starr Chester of Battelle Memorial Institute, who was interviewed by the author of the Post's

article, is quoted as authority for the prediction that "Sooner or later we shall develop an efficient desalting process, and as sea water is pumped inland the minerals will be extracted for fertilizer and industrial chemicals, the fish, seaweed and plankton will be filtered out and dried for livestock feed and fertilizer, and the fresh water will go onto our dry land. While irrigation alone might not pay the cost of the operation, the combined yield of products should make it profitable. There are about 160,000,000 tons of solids in one cubic mile of sea water—including 4,000,000 tons of potash and 26,000,000 tons of magnesium compounds, plus many other minerals we can use."

AC

The latest new word being bandied about, we are privileged to advise ardent readers of this here colyum, is "automation." We haven't seen a word take over like this one has, since "technocracy", whose rapid boom and bust back ten or fifteen ago may be recalled by some of our more mature readers. "Automation", a recent press release advises us, has now "attained acceptance in the lexicon of industry." "Okay," say we, "but what does it mean, and what is this lexicon business?"

AC

Word comes through to us down the grapevine that all hell has broken loose in the small package insecticide market. Taking a leaf from the price cutting and discount abuses that have characterized the bulk market over recent years, new faces are now reported entering the small package market with the same tactics. Prices have been chopped sharply, and special discounts offered freely on such staple items in the home garden line as 50% malathion, pound packages of 5% chlordane and 3/4% rotenone, 50% wettable chlordane, etc. We hate to see this happen. There was no excessive margin of profit in these items before the recent outbreak of price cutting, and it will do no one any good to have prices in the small package field follow the dismal pattern of bulk materials over recent years.

(Continued on Page 122)

## Pink Bollworm Spreading Outside Quarantined Area

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Economic Insect Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward



THE gin trash inspection program annually conducted by the Pink Bollworm Control Project and co-operating state agencies is well under way and to date has resulted in the recovery of pink bollworm specimens in three counties outside the quarantined area of Arkansas. In 1953, collections of this serious cotton pest were made in two southwestern Arkansas counties, Hempstead and Miller, resulting in eight counties in the southwestern part of the state being placed under quarantine. Gin trash inspections recently completed in the quarantined counties revealed infestations in six of the counties, Sevier, Little River, Howard, Hempstead, Miller and Lafayette. As of October 31, inspection in counties outside the quarantined area had resulted in the finding of specimens in Clark, Logan and Yell.

Although the entire state of Oklahoma is under quarantine, pink bollworms have been found for the first time in several counties of the state. Gin trash examinations through October resulted in the finding of specimens in Choctaw, Haskell, Johnson, Marshall, Muskogee, Okfushee, Oklahoma, Pontotoc and Pottawatomie counties. Most of the counties that had previously been found infested were showing a slightly higher rate of infestations than heretofore.

Texas gin trash examinations to date have not shown any alarming increase over last season. In the lower Rio Grande Valley of Texas, the average number of pink bollworms collected was slightly higher than last season but very low compared to the average of recent years. The cotton areas of Mexico adjacent to the Lower Rio Grande Valley showed

the average count of pink bollworms per bushel of gin trash to be less than on the United States side of the river, but even this number was a marked increase over 1953 for the same area. East Texas counties bordering Louisiana are about equally divided in showing increase and decrease over the 1953 inspection. A greater increase was found in some central Texas counties as well as the west-central counties of Tom Green, Concho, Coke and Irion. Other west-central counties showed a decrease. Northeast Texas counties showed about the same degree of infestation as last year, but in the South Plains area of west Texas most of the counties recorded a higher infestation with a few about the same. Some increases were found in the Winter Garden area and south central counties.

Louisiana inspections have not revealed any infestations outside the quarantined area. However, in the quarantined area, Bienville and Webster Parishes were found infested for the first time. Pink bollworms were found in the old regulated Parishes of southwestern Louisiana at the rate of .035 per bushel of gin trash as compared to .003 last season.

Inspections have been made in the following states with results, to date, being negative: Alabama, Georgia, California, Tennessee and Mississippi.

Pink bollworms have been intercepted in several instances at the traffic inspection stations established in Arkansas, Louisiana and Mississippi to examine the movement of materials which might harbor pink bollworms from quarantined to free areas. During the latter part of Sep-

tember, the Fulton, Arkansas, station recovered 83 worms from a small portion of material. Pink bollworms were also intercepted at the Garland, Arkansas, and Many, Louisiana, stations. At the Vicksburg, Mississippi, station, 10 specimens were found in cotton bolls carried by a tourist.

### Spittle Bug Survey—Illinois and Ohio


SURVEYS to determine the fall adult spittle bug populations have been conducted in Illinois and Ohio. In Illinois where the sweepings were taken in clover and alfalfa fields, the highest average was found in the northeastern part of the state with an average of 2.4 adults per sweep. The highest average for an individual field was 6.5 per sweep. This was slightly higher than in 1953 for the northeastern area but counts were lower in the eastern section than last season.

The two sections of Ohio showing an average of more than one adult per sweep during the 1954 fall survey were the northeast with 2.51 adults per sweep and northeast-central with 2.79. Each of the other sections of the state recorded a lower rating than last season. The most marked declines were in the central and southwestern areas which declined from 1.82 to 0.72 and 1.25 to 0.71, respectively. The Ohio survey is based upon the criterion of one spittle bug per sweep as an indication of the number that might create an economic infestation the following year.

### Fruit Piercing Moth in Mexico

MEXICAN Fruit Fly Control Project cooperators in Mexico recently reported on the activities of a fruit piercing moth in that Nation. In 1953 the moth, *Gonodonta bidens*, was reported as damaging citrus fruit in the States of San Luis Potosi, Tamaulipas and Nuevo Leon, Mexico, during the months of September, October, and November. Losses in early oranges ranged from 20 to 50 per cent. The moth has appeared again in the Northeastern section of Mexico but economic damage up to October 25, the time of the report, remained insignificant.★★

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## LISTENING

## Post

### Eradicant Sprays For Pecan Scab Control

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of **AGRICULTURAL CHEMICALS**. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



**R**ICHARD H. Converse reports the results of tests carried out by the Oklahoma Agricultural Experiment Station in cooperation with the Agricultural Research Service of the United States Department of Agriculture. He writes that although much research has been conducted throughout the pecan-growing belt on the control of pecan scab, caused by the fungus *Cladosporium effusum*, the disease is still very difficult to control in epiphytotic years, and the cost of protectant spraying is a considerable item in pecan production.

*C. effusum* overwinters in stromata (that is, thick layers of fungus growth; stroma is the singular form) formed on lesions on twigs, nut shucks, and leaf parts. In the spring these stromata produce abundant conidia (spores), which serve as primary inoculum. This life cycle suggests the possibility of increasing the control of scab by practices designed to eradicate the causal fungus during the dormant season. Various eradication methods have been tried, among them plowing late in the winter to bury overwintered inoculum and other similar sanitary measures, and dormant spraying with several different materials. Results have mostly been unsatisfactory or inconclusive.

Two fungicides which have been used as eradicates of fungi patho-

genic on crops other than pecan seemed promising for trial against pecan scab. They are monocalcium arsenite and some of its formulations, and the chlorophenates.

The study reported was conducted in 1953 in a grower's orchard near Paden, Okfuskee County, Oklahoma, on 21-year-old trees of the very scab-susceptible variety Squirrel. Attached nut shucks were dislodged from experimental trees before sprays were applied. Sources of primary inoculum therefore consisted of numerous twig lesions in the trees and an abundance of scabbed nut shucks and leaf parts on the ground beneath the trees, which was not cultivated. Four single-tree plots were used for each treatment in a randomized block design.

No attempt was made to use eradicate sprays alone. All trees used in the test received five applications of ziram (2 lbs. of Zerlate/100 gal.) during the growing season. Information concerning the eradicate fungicides used is given in Table 1. Control trees received the five protectant sprays but no eradicate spray. All sprays were applied with conventional high-pressure hydraulic equipment. On March 21, 1953, just before bud break, the eradicates were sprayed on the trees and on the ground within an area 30 feet in

diameter immediately around the trees at the rate of 50 gallons per tree. The five subsequent protectant sprays were applied April 25 and at three to five week intervals thereafter until August 21.

Scabbed nut shucks and leaves that had overwintered on the orchard floor and scabbed twigs from trees were used for sporulation-level determinations. These overwintered materials were obtained at random from the spray plots. They were washed, incubated in a moist atmosphere out-of-doors for 48 hours, and classified on a four-point scale based on the number of sporulating stromata of the scab fungus. About ten subsamples per tree were obtained from each of two or three trees per treatment. The percentage germination of spores produced on overwintering stromata was found by streaking spores on agar and making counts after incubation at 25°C for 48 hours.

During the growing season, development of scab on nuts was traced by means of lesion counts on five tagged nut clusters chosen at random on each tree in the test. Near the end of the growing season estimates of the percentage of shuck area that was scabbed were used in place of lesion counts because the lesions had become so numerous. The coefficient of correlation between area-scabbed estimates and actual lesion counts of a number of nut samples was highly significant.

The sporulation level of overwintered scab stromata and the germinability of spores produced are presented in Table 2. The sporulation in the case of two of the three eradicates was not reduced materially one week after the eradicate had been applied; however after four weeks, sporulation on eradicate-sprayed twig lesions was virtually eliminated, while that on nut shucks was markedly reduced by all eradicates tested. Sporulation on leaf stromata, unsprayed as well as sprayed, was at a constant low level. The germination of spores produced on overwintered stromata seemingly was unaffected by the eradicate treatments, with the possible excep-



tion of spores from lesions sprayed the week before with pentachlorophenolate.

As the growing season progressed, the number of scab lesions on nut shucks increased on all trees, but the increase was greater on control than on eradicator-sprayed trees (Table 3). By August 28, the shuck-scab level on the monocalcium arsenite plots was only one-fourth that on control plots, a highly significant difference. There were more scab lesions on shucks treated with the other two eradicator, but the numbers were highly significantly less than those on shucks from control trees.

In the period from August 28 to September 25, when final data were taken, differences in scab level on the nut shucks between eradicator and the control became less pronounced. By the end of the season monocalcium arsenite was the only eradicator that gave significantly better results than the control.

None of the eradicator tested produced any noticeable symptoms of phytotoxicity on the Squirrel pecan trees used in the test.

The results reported are based on a one-year study during a season favorable for the development of scab on pecan nut shucks but not on pecan foliage, and the conclusions are necessarily preliminary.

When scab incidence is used as the basis for comparisons of eradicator-spray treatments, the influence of eradicator sprays in lowering lesion counts below those on the control becomes apparent. The limited ground area sprayed and the contiguity of dormant-sprayed and unsprayed trees might have been expected to obliterate any initial lowering of the primary inoculum level by subsequent cross-infection from secondary inoculum. Such cross-infection apparently did not occur very readily. This may be explained by the fact that the conidia of the scab fungus seemingly are not wind-borne for any great distance. Spore-trap data (obtained from the variety Squirrel, at Stillwater, Oklahoma) indicate a rapid decrease in the number of *C. effusum* spores as collections

were made beyond the limb-spread of the tree.

It is possible that failure to wet all parts of the overwintered material thoroughly with eradicator accounted in part for the inability of these eradicator to suppress sporulation on

overwintered stromata more completely, and for the increase in scab level encountered later in the season.

Much more information will be needed before the economic value of eradicator fungicides for pecan scab control can be assessed.

**Table 1**  
Composition and final concentration of three eradicator fungicides tested for control of pecan scab at Paden, Oklahoma, 1953.

Eradicator	Trade name	Final Concentration per 100 gallons of water
80% monocalcium arsenite	Corona monocalcium arsenite CM220	3 lbs.
19% sodium dinitro-ortho-cresolate, 5% sodium butyl naphthalene sulfonate and 2% sodium chromate	Elgetol	1 gal.
37% sodium pentachlorophenolate and 5.5% sodium salts of other chlorophenols	United Chemical Co. Dormant Fungicide (Dustless)	4 lbs.*

\*Plus 1 gallon of Dendrol dormant oil emulsion.

**Table 2**  
Influence of eradicator sprays on the production and germination of spores from overwintered stromata of *Cladosporium effusum* on pecan shucks, leaves, and twigs obtained from the variety Squirrel, Paden, Oklahoma, March to April, 1953

Date of examination and eradicator sprays	Sporulation level <sup>a</sup>			Spores germinating (percent) on		
	Shucks	Leaves	Twigs	Shucks	Leaves	Twigs
March 21 <sup>b</sup>						
Monocalcium arsenite	2.8	1.2		80.8	75.0	
Dinitro-ortho-cresolate	2.4	0		87.0		
Pentachlorophenolate	2.2	1.0		90.6	92.2	
None	2.4	0.7		92.5	33.0	
Average	2.5	0.7		88.2	82.0	
March 28 <sup>c</sup>						
Monocalcium arsenite	2.0	0.2		88.2		
Dinitro-ortho-cresolate	2.1	0		90.0		
Pentachlorophenolate	0.7	0.1		67.6	0	
None	2.6	0.2		86.5	90.0	
April 18 <sup>d</sup>						
Monocalcium arsenite	1.5	0	0.1	92.4		75.0
Dinitro-ortho-cresolate	1.6	0	0.3	89.6		80.6
Pentachlorophenolate	1.7	0	0.3	87.2		95.0
None	2.5	0.1	3.0	87.7	100	87.5

(<sup>a</sup>)Sporulation ratings: 0—none; 1—1 or 2; 2—3-10; 3 more than 10 sporulating stromata, per 85x stereoscopic microscopic field.

(<sup>b</sup>)Just before application of eradicator.

(<sup>c</sup>)One week after application of eradicator.

(<sup>d</sup>)Four weeks after application of eradicator.

**Table 3**  
Increase in scab lesions on nut shucks of the pecan variety Squirrel given various eradicator-spray treatments, Paden, Oklahoma, 1953.

Eradicator spray	Number of lesions per nut shuck on			Area scabbed on shucks of mature nuts on Sept. 25 Percent
	June 25	July 28	Aug. 28	
Monocalcium arsenite	0	3.70	45.6	21.4
Dinitro-ortho-cresolate	9	2.44	72.1	29.7
Pentachlorophenolate	0	1.15	70.5	34.1
None	0	6.22	183.3	47.6
L.S.D. (5% level)		5.46	51.0	
L.S.D. (1% level)			73.4	

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## Technical

### SECTION

## Fifty Years of Fungicides\*

By A. E. Dimond

AN outstanding contribution of fungicides to a stable food supply is their use as seed treatments. Although copper sulphate, hot water and formaldehyde were available in 1900, they were messy to apply and often injured seeds. Dry chemicals, coated on seeds, offer greater ease of applications and promised freedom from injury. The development of organic mercury compounds and use of copper carbonate had by 1917 yielded two groups of materials on which a start could be made. Continued work resulted in the development of a group of copper and organic mercury fungicides for seeds: copper carbonate, cuprous oxide, Ceresan, Semesan, and others. In consequence, bunt on wheat, *Helminthosporium* blight on barley, and smut on oat and barley became much less important as diseases. In some cases, the incidence of diseased plants dropped from 20 per cent to negligible levels, while yields of grain rose as much as 25 per cent. The cost of such seed treatment is low and the return on the investment is probably unparalleled in the history of plant protection. Vegetable seed protection has been similarly rewarding. Such fungicides as thiram, cuprous oxide and chloranil now offer protection against damping-off organisms, whereas older treatments were designed only to kill pathogens on the surface of the seed.

The discovery of Bordeaux mixture and the mastery over late blight of potato were important developments. Less familiar, perhaps, is the

sequel to the late blight story: the development of pesticides for potatoes, which in the United States overcame the phytotoxicity of Bordeaux mixture and the inadequacy of older insecticides.

In 1946, McCallan ranked the combination of Bordeaux mixture injury and insect damage as the most serious among potato disorders in the U. S. A. From 1942 to 1945 the ethylene bisdithiocarbamates, nabam and zineb, were being developed and coming into use by potato growers, along with DDT in the insecticide field. This combination eliminated the injurious effects of spray and insects, and by 1950 the combination was almost the standard potato spray in the U. S. A.

Experience with the DDT-nabam or zineb spray combination has shown that potatoes must be sprayed more frequently and coverage must be more thorough than when Bordeaux mixture is used for blight control. Rich (1954) recently compared Bordeaux mixture and zineb with respect to buildup of deposit and its redistribution or deterioration in weathering and has suggested a basis for predicting when redistribution will occur.

The practical achievements in control of disease by fungicides have depended in the main on laboratory assay methods for measuring fungitoxicity and tenacity. Only through these assays could modern fungicides be developed on the scale they are today. Perhaps the outstanding problem for the future involving protective fungicides is the high likelihood

that strains of fungi will arise which are resistant to presently effective materials, a problem already serious in entomology and in medicine.

If resistant fungi are likely to develop, we should take steps now to diminish that possibility. Three courses are open to us, some more feasible than others: One may (1) search for fungicides which have multiple toxic mechanisms against each pathogen for which they are used, (2) use two fungicides, each having different toxic mechanisms and always apply them in combination or (3) apply fungicides to resistant varieties of the host. If these suggestions sound extreme, recall how it would have sounded in 1944 to suggest that DDT would not be adequate to combat houseflies.

Within the past ten years, considerable progress has been made in learning to control those diseases which enter the host through insect feeding wounds, through roots and natural plant openings. Both the antibiotic and synthetic plant chemotherapeutics are proving useful in controlling plant disease within the host. The use of antibiotics in plant disease control has recently been reviewed by Brian (1954), who, with his colleagues, has pioneered in these studies. Control of fireblight of apple and pear and of the bacterial diseases of vegetables appears assured in the next few years. Likewise, the development of compounds which permeate the host and make it resistant to disease or which kill the pathogen offers promise for plant disease control in the future. This technique is already in use by Connecticut growers for control of *Fusarium* wilt of carnations and of red stele on strawberry. Also there is hope that the cereal rusts will succumb to chemotherapy. A year ago, calcium sulfamate was reported to reduce materially the incidence of leaf and stem rust of wheat materially when applied as a spray concentrate from airplanes. We may hope that the near future will see these approaches to disease control reduced to commonplace practice.

\*Abstract of report by A. E. Dimond, Connecticut Agricultural Experiment Station, New Haven, Conn., presented at the Association of Applied Biologists, London, England, September, 1954.

### New Systemics, L-11-6, 12008

Preliminary but promising results with new systemic insecticides to control a variety of cotton insect pests, including some that chew on plants, are reported by entomologists of the U. S. Department of Agriculture.

Laboratory tests by the Agricultural Research Service and the Texas Experiment Station, showed the new systemics to be lethal not only to sucking insects, but also to such plant chewers as the boll weevil and cotton leafworm. When cotton seed was treated with the new systemics and field planted, the most effective of the chemicals gave protection against thrips, aphids, and spider mites for more than a month. The two most promising of the compounds tested are L-11-6 and 12008, which may be identified as: O, O-diethyl S-ethyl mercapto-methyl dithiophosphate and O, O-diethyl S-isopropyl mercaptomethyl dithiophosphate, respectively. Other mercaptomethyl-dithiophosphate compounds proved toxic to chewing insects in these tests, but L-11-6 and 12008 were the most effective.

### Krilium Study Discussed

The soil conditioner, Krilium 186, reacts favorably upon some of the physical properties of Ontonagon silty clay at Ashland, Wis., as reported in a progress study of the Wisconsin experiment station. The treated soil "had more large pore space, less surface crusting, easier air penetration, better water infiltration and more stable aggregates. Yield of corn fodder on treated plots was about a ton better than on untreated plots." Results from use of Krilium on other soils are also reported. Rate of use was from 200 to 1,500 lbs. per acre, which would make general field use expensive, but might be practical, the investigators suggest, for garden plots, greenhouse soil and other specialized uses. Gardeners are given instructions on how to proceed to determine if use of Krilium would be advisable. Another section of the report deals with use of Krilium on flower test plots. The

investigators, however, want to determine how long one application of Krilium remains beneficial in the soil and they also want to study methods of application to cut costs. Cooperation in this project came from Monsanto Chemical Corp.

### Pesticide Dispersant

Properties of Marasperse-N as a dispersant in wettable powder insecticides and other products are described in a series of three pocket size folders issued recently by Marathon Corp., Rothschild, Wisc.

### Fertilizer Research Reported

Research at Iowa Agricultural Experiment Station, Ames, Ia., indicates that, when limited to choice, it is better for the farmer to spend his nitrogen fertilizer dollar for the second year of corn in a rotation, rather than for first-year corn. In its latest annual report, the station also says that when commercial fertilizer is applied to corn, a considerable amount of carry over of fertilizer occurs the following year.

Experiments on the effect of nitrogen on second-year corn were conducted over a two-year period. First year corn, grown on Carrington loam, in a four-year rotation of corn-corn-oats-meadow, gave an increase of ten bushels an acre for the first 20 lbs. of nitrogen used, but an additional 20 lbs. of nitrogen produced no increase, the report states. With second-year corn the first 20 bushels of nitrogen per acre increased yield 9 bushels, and the next 20 lbs. boosted the yield another 15 bushels of corn per acre, for a total increase of 24 bushels per acre for 40 lbs. of nitrogen.

In an identical rotation on Belinda silt loam, first year corn, without fertilizer yielded 18 bushels more on an average for the two years than did second year corn. But when fertilizer to provide 60 lbs. of nitrogen was used on the second-year corn, the first-year corn without nitrogen was ahead only 10 bushels.

In discussing how fertilizer helps increase the second year's crop, the report says experiments have shown

### Repellents for Tabanids

A total of 258 synthetic organic compounds were tested in the laboratory as repellents of the deer fly (*Chrysops discalis* Will.) with white mice as the host animals. Only a few of the compounds showed any promise of long-lasting repellents, 2-amino-3-isobornyloxy-2-methyl-1-propanol (0-4265) and Santomerse DT (0-16-484) were the most effective. Pyrethrum sprays were not effective unless used at very high concentrations. A. R. Roth, U.S.D.A. Bulletin ARS 33-2.

that a 60 lb. application of nitrogen to corn will increase the yield of oats the next year "About as much as you'd get from a 20-lb. application on ground that had not been fertilized."

"This carry over," continues the report, "will vary from year to year and in different soils. In 1951, increases in yield due to residual nitrogen on four fields were 4, 4, 10 and 8 bushels per acre. The corresponding increases for 20 lbs. of nitrogen on fields which had not been fertilized the year before were 8, 10, 18 and 9 respectively.

"So, in this case, the residual effect on the first three soils from 60 lbs. of actual nitrogen was only one-half that obtained from direct application of 20 lbs. of nitrogen. Other experiments further indicated that phosphorus and potash fertilizers also have considerable carryover effects."

In view of the price of commercial fertilizer," the report comments, "this carryover factor should be taken into consideration in determining the need of any field where fertilizer was applied the previous year."

Other sections of the Iowa report, dealing with soil management, present results which indicate conclusions as expressed in the section titles: "Use of lime may increase corn yield after legumes;" and "Nitrogen increases brome grass seed yields, with row application, showing greater yield than broadcast application."





Chafer adult      Chafer grub  
about 5x magnification

### European Chafer Spreads

Federal and state agencies are setting up large-scale defense measures to arrest the spread of a new soil-inhibiting pest, called the "European chafer." The insect is blamed for the destruction of grass roots in home lawns, cemeteries, and golf courses, but there's reason for concern among agriculturists, too. Foster L. Gambrell, entomologist at the Experiment Station in Geneva, N. Y., warns that this root-feeder has also been found in pastures, clover fields, grain plantings, and in some perennials.

The chafer is believed to have immigrated from Europe about 20

years ago in a nursery stock shipment. It has been reported in several eastern states and may well have been spread around the country in soil used for packing nursery stock. Commercial nurseries in the infested areas are using soil-treatment measures to check further spread of the insect.

The European chafer is seldom seen because practically all of its life cycle is spent underground. Only during the few short weeks of the mating season in summer do the adults emerge from the ground—and even then their flights are limited to the minutes between dusk and complete darkness. The adults look very much like their June bug relatives.

Control measures are aimed at the whitish grub form which destroys grasses, legumes, and grains, by feeding on the roots. New York State and USDA workers are recommending 25 to 50 pounds of DDT, or 10 to 20 pounds of chlordane per acre where infestations are evident. These high rates insure heavy residual deposits for enduring protection.

### Triple-Liquid Application

A new method of applying nitrogen, phosphates and potash in liquid form in a single operation was announced recently by John W. Dugan, president of Plantation Fertilizers Corp., Houma, La. The machine applies from 20 to several hundred lbs. per acre of 52%  $P_2O_5$  by varying the rate of flow to suit the rate at which the land is covered. Flow is continuous and comes out each applicator foot in equal amounts. The unit consists of three tanks for the three liquid fertilizers which discharge the individual liquids at previously designated rates of flow. The machine applies all three elements simultaneously in such a manner that there is no streaking in crops resulting from uneven distribution.

The three elements are brought to the field separately . . . mobile tanks being supplied by the applicator firm, and the elements are mixed by the machine as it moves through the field, applying them directly to the soil in desired amounts of each.

The equipment will be offered under the trade name "Flo-Mix". Patent applications have been filed on all the Flo-Mix methods and equipment.

### "Amizol" New Herbicide

Leon Cherksey, president of American Chemical Paint Co., Ambler, Pa., announced last month that W. W. Allen, chief formulating chemist of the firm's agricultural division, has been granted a patent on the use of 3-amino-1,2,4-triazole as a herbicide and cotton defoliant.

The chemical, formerly used only in small quantities in photographic laboratory work, is now undergoing world-wide field tests in its new role. It will be formulated and sold by American Chemical Paint Co., under the trade name Amizol.

Cherksey said that American Cyanamid Co., of New York will manufacture 3-amino-1,2,4-triazole and has been licensed under ACP's patent to market it as a herbicide and defoliant in the United States.

## NEW BOOKS

*Plant Regulations in Agriculture*, by H. B. Tukey. Published by John Wiley & Sons, Inc., New York. 267 pages, 6 x 9", cloth binding, price \$5.50.

This text describes the different uses of plant regulators . . . what plant regulators are, how they operate, how plants respond and where they belong in agriculture. Specific attention is given to the use of plant regulators in propagation, fruit set, blossom thinning, pre-harvest drop, plant breeding, fruit ripening, sprout inhibition, weed control in farm crops, ornamentals, lawns, small fruits, rights of way, and equipment and instructions for applications.

Each chapter begins with an introductory section presenting facts and principles, before moving into the more involved and advanced phases.

*Soil* by G. V. Jacks. Published by the Philosophical Library, Inc., New York. 22 pages, 5 1/2 x 8", cloth binding, price \$5.00.

This text is directed to the farmer and student of agriculture, discussing the basic properties of all soils, and how these vary according to the conditions under which a soil is formed. The author points out that the common agricultural operations affect the biology and thus the plant-producing capacity of the soil. Various chapters discuss the chemistry of soil, soil water, humus, cultivation, forest soils, soil erosion and soil classification.

*Successful Commercial Chemical Development* by H. M. Corley. Published by John Wiley & Sons, Inc., New York. 374 pages, 6 x 9", cloth binding, price \$7.75. According to the publisher, the purpose of this book is to outline the patterns of new product developments. It discussed product pricing, advertising, origin and handling of new product ideas, objectives preceding process development, etc. A particularly worthwhile chapter concerns toxicology, safety and handling and another which reviews labeling, packaging and shipping considerations.



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### Spring Alfalfa Weevil Control

Springtime spraying or dusting with the right insecticide is the best way for western growers to protect alfalfa from the alfalfa weevil, according to entomologists of the U. S. Department of Agriculture. Using chlordane, dieldrin, or heptachlor before alfalfa plants are two inches high destroys overwintering adult weevils before they lay eggs.

Summer treatment (May or June) to control weevil larvae—an alternative for growers of alfalfa as a hay crop—offers the grower a wider choice of chemicals: aldrin, heptachlor, lindane, methoxychlor, or parathion. If the first growth of alfalfa is produced for seed, and the weevil larvae have not been controlled by the use of DDT applied to control lygus bugs, which damage the alfalfa blooms and seeds, a special treatment with this insecticide may be justified. These recommendations are discussed in detail in new USDA Leaflet 368, prepared by entomologists of the Department's Agricultural Research Service. They apply only to alfalfa weevil control in western States—Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oregon, South Dakota, and Utah.

### Fungicides For Tomatoes

At a meeting of the Texas Citrus and Vegetable Growers and Shippers, Inc., in Dallas, Dr. J. A. Evans, E. I. Du Pont de Nemours & Co., Wilmington, recently presented a report on the "Top Grade and Yield of Tomatoes Through Fungicides." In his discussion, Dr. Evans reviewed the use of correct fungicidal protection in crops, use of copper fungicides, bordeaux mixtures, Fermate, Zerlate, Nabam, Manzate, Zineb, etc. Application rates and results with the various treatments are included in the discussion.

### Report On Warfarin Bait

Recent marketing of wet meat or fish baits containing warfarin resulted in a report to formulators by the Wisconsin Alumni Research Foundation, Madison, Wisc., including the

following statement: "The Wisconsin Alumni Foundation advises warfarin formulators not to offer to the general public any perishable meat or fish baits with warfarin. For the professional pest control operator or for the food plant sanitarian who uses warfarin in his service, there may be circumstances under which the use of such type of bait is justified, but this has no application to the general consumer."

The Wisconsin Alumni Research Foundation reports that the effectiveness of cereal grain baits containing warfarin is comparable to wet meat or fish baits, which are much more hazardous.

### Seed Treatment Tests

One of the important factors in determining damage from seedling diseases in corn was found to be the prevalence of broken places in the pericarp. *Pythium* could be isolated from the scutellar area of some weeds with broken pericarps in only 3 days after planting in moist field soil at 50°F. Commercially processed seed was found to have pericarp injuries in about 81 per cent of the kernels. A staining technique was necessary to find many of the broken places. In a 3-year field test, commercially processed seed, seed with pericarps partially removed from the crowns in the laboratory, or immature seed showed a significant response to seed treatments with fungicide protectants. Mature seed with sound pericarps did not respond in either stand or yield. The genetic constitution and age of the seed were other important factors influencing susceptibility to seedling blight and response to seed treatment.

In controlled low temperature tests, germinating conditions could be made sufficiently adverse that seed with sound pericarps suffered considerable loss in stand unless protected by a suitable fungicide. For example, stands of untreated seed with sound pericarps after 20 days in a cold chamber were approximately equivalent to stands obtained with untreated seed with injured pericarps kept in the cold room for a little less than 4 days.

The "cold test" was found val-

### Endrin For Corn Earworm

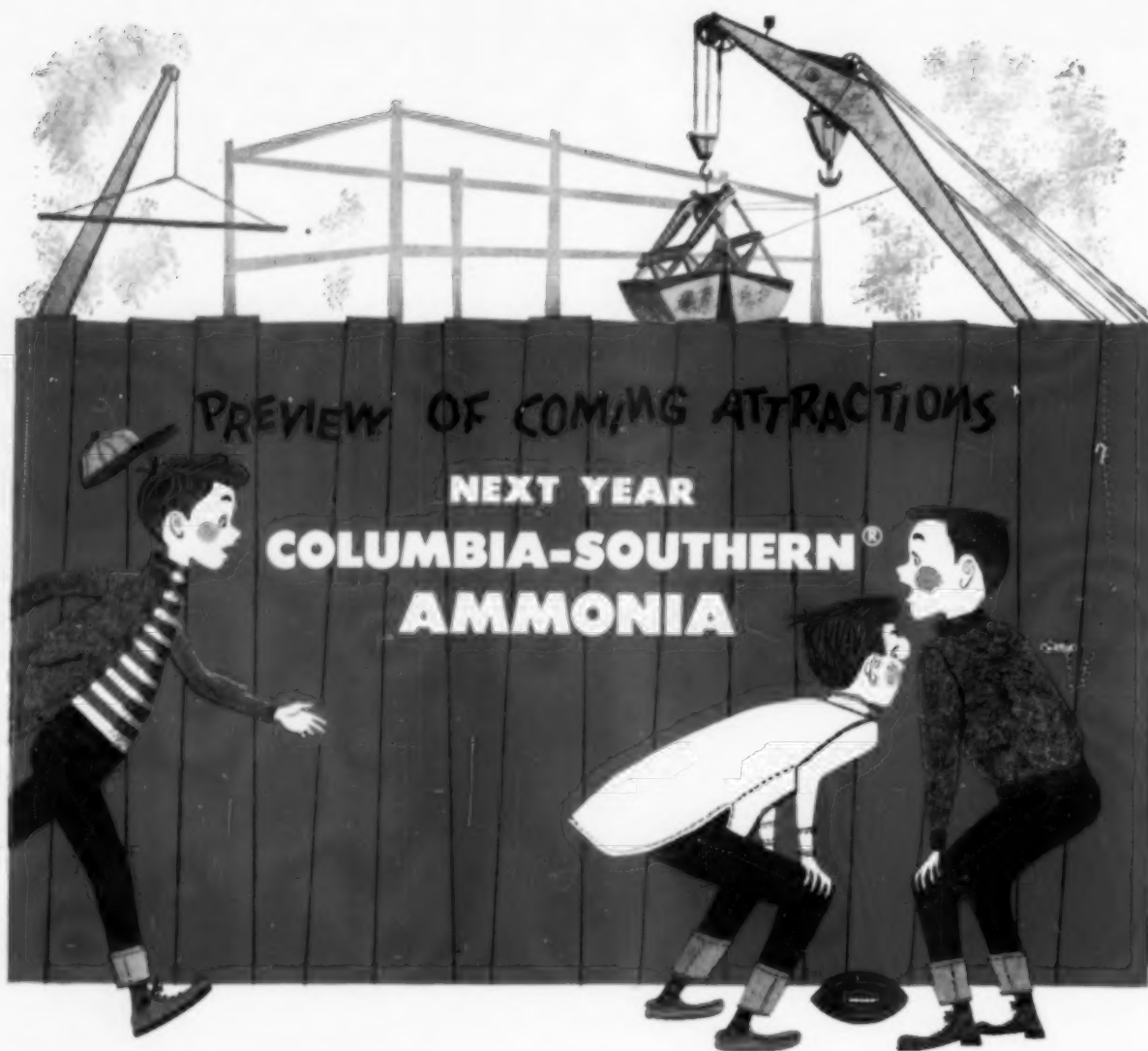
Experiments conducted in the summer of 1954 at the Connecticut Agricultural Experiment Station, New Haven, indicate that endrin offers good control of corn earworm. 80 to 90 per cent protection was obtained against this pest on infested sweet corn fields, as compared with 100 per cent infestation in untreated plants. Endrin was applied as a 25 per cent wettable powder at the rate of 2 pounds in 100 gallons of water per acre. Care was taken to spray the entire corn plant. The first application was put on just as the plants were beginning to silk, and when earworm eggs were first observed.

uable for screening new seed treating compounds and determining comparative efficiency of compounds under very adverse germinating conditions, but certain other information could be obtained only by field tests in which plants were grown to maturity.

In cold tests, stand counts alone usually have served as a good measure for determining differences in treatments. This is because differences in stand have been closely correlated with differences in vigor. This did not hold, however, when germination was retarded by low moisture rather than low temperature. In field tests, stand differences due to treatment were usually closely correlated with yields, but there were exceptions when differences were expressed in stand only or in yield only.

Soil sufficiently dry to retard seed germination was found to be conducive to an increase in seedling disease, which was manifested principally by loss in vigor. This was especially true when the pericarp was injured, and the severity of the damage was in proportion to the length of time the seed was in dry soil before adequate water was added. Seed treatment gave partial control.

To determine benefits that might be expected from seed treatment, the use of field tests with commercially processed seed of widely used hybrids and normal practice of time and rate of planting are emphasized. By B. Koehler, *Phyto Pathology* 44, #10, 575-583, 1954.



Columbia-Southern's new Ammonia plant at Natrium, West Virginia, will be in full production in early 1955.

Many users will find it advantageous to purchase their ammonia requirements from this new source.

If you are contracting now for your 1955 deliveries of ammonia, you may find it desirable to include this new plant production in your plans.

For further information, please call, write or wire our Pittsburgh Office.

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## INDUSTRY News

### Pence to Dow Atlanta Ofc.

Appointment of C. B. Pence as supervisor of agricultural chemicals sales in the Atlanta office territory was announced recently by the Dow Chemical Co. Mr. Pence will have charge of all agricultural chemicals sales in Florida, Georgia, Alabama, North Carolina and South Carolina.

### Geigy Merges Branches

Geigy Agricultural Chemicals announced last month the consolidation of its Aberdeen, N. C. and McGregor, Texas branch offices into one office located in Leland, Mississippi, in conjunction with its recently constructed and enlarged manufacturing plant at that location. E. L. Jarrett, Sr. has been named manager of the enlarged Southern territory comprising those states in the cotton belt together with Florida. Sales offices, plants and warehouses will be maintained at Aberdeen, North Carolina, McGregor, Texas and Orlando, Florida.

New construction work at the Leland plant and installation of additional equipment to provide increased production capacity is now in progress and will be completed by the end of the year. This expansion of Leland plant facilities will provide the entire cotton south with better service on Geigy's complete line of cotton poisons, insecticides, fungicides and other agricultural chemicals.

Geigy's new Diazinon residual fly killer, its line of Sequestrene chelated minor elements, chloroben-

zilate, and a complete line of livestock insecticides and specialty products will be formulated and packed at the Leland plant to supply the southern market.

### Butler Names two VP's



W. L. Smith



J. A. Morgan

Directors of Butler Mfg. Co., Kansas City, Mo., recently named J. A. Morgan to the newly created post of executive vice president and W. L. Smith as vice president of engineering and production. Mr. Morgan has been with Butler Co. for 15 years, starting originally in the sales and advertising departments. Mr. Smith joined the Butler organization in 1934 as a product engineer.

### United Clay Elects Gentsch

At a special meeting of the board of directors of the United Clay Mines Corp., Trenton, N. J., Bernhard F. Gentsch was elected president to succeed the late Ogden A. Kantnor. Gordon W. Lee, vice president of the company, was appointed vice president and general manager, and Girard W. Phelps was named vice president and technical director. Ralph E. Rhodes, Jr. was appointed sales manager. Other officers of the company are Ogden H. Dilts, treasurer, and Kenneth E. Ward, secretary. Mr. Dilts and W. Enos Wetzel were named as members of the board of directors.

### Ark. Co. Changes Name

The Arkansas Plant Food Co. has changed the trade name of its fertilizer products from "Arkansas Quality Fertilizer" to "Green State Plant Food."

The board of directors also approved formally an earlier decision to change the name of the cooperative fertilizer manufacturing firm from Arkansas Farmers Plant Food Company.

### To Hold California Agri. Forum

The Central California Agricultural Forum will be held in Fresno, Calif., December 15. Dr. Maurice Peterson and a selected panel will discuss the lessons learned in 1954 with respect to crops growing on diverted acreage.

In the afternoon session the more efficient use of cover cropping will be considered, together with some of the newer insect control recommendations.

New problems caused by the Khapra beetle will be discussed by H. M. Armitage, California Dept. of Agriculture, L. J. Padgett, Western Federal Survey entomologist, and Mr. Earle Gammon, Calif. Dept. of Agriculture.

### Fertilizer Group Appoints

A. B. Pettit, chairman, Engineering Committee, Fertilizer Section, National Safety Council, and supervisor, Industrial Health and Safety, Davison Chemical Co., Division of W. R. Grace & Co., last month an-

nounced the formation of a sub-committee on the mixing of pesticides with fertilizer.

Edward J. Largent has accepted chairmanship of the sub-committee which will develop safety data sheets for distribution to the fertilizer industry. Mr. Largent has been an industrial hygienist in the Tennessee Valley Authority.

## Pennsalt Names Bixby



At its national sales meeting for agricultural chemicals, Pennsylvania Salt Manufacturing Co. of Washington appointed Arthur F. Bixby as manager of agricultural chemicals. Mr. Bixby has been with Pennsalt for 16 years.

## Ewing, Knippling at Cotton Conference

DISCUSSIONS concerning developments in insecticide research, provisions of the Miller Bill, systemic insecticides, etc., were scheduled for the eighth annual Beltwide Cotton Insect Control Conference, held December 2-3 at the Hotel Adolphus, Dallas, Tex. E. F. Knippling USDA, featured speaker at the 2-day meeting, recently pointed out that at least 10 per cent of the production from soils is destroyed by insects. Dr. Knippling reported on what insect control has meant to cotton.

Mr. K. P. Ewing, in charge of cotton insect research for the U. S. Department of Agriculture, cited the need for expanded research in cotton insect control. Despite new insecticides and improved control methods, said Mr. Ewing, cotton growers are little better than holding their own against insect pests. He pointed out that 10 years ago cotton insects were estimated to destroy one in every seven bales of cotton produced. The loss estimate is still one bale in seven. This apparent lack of progress is partly explained by the more exact estimates of damage that are possible today. Increasing knowledge of the insects' damage-potential has led to more conservative, truer estimates.

Mr. Ewing mentioned the improvement in the quality of cotton as a factor that attracted greater varieties of destructive insects. In his opinion, stepped-up research in the following area could do most toward solving the problem: the finding and testing of systemic insecticides, screening of organic chemicals for insecticidal activity, studies on the development of resistance to insecticides

by insects, greater use of natural enemies of cotton insects, and the expansion of the pink bollworm research program.

Another feature of the annual conference was a panel discussion on the best means of reporting insect control information direct to the farmer through public media. The panel included: L. M. Sparks, South Carolina Extension Service; J. N. Roney, Arizona Extension Service; F. H. Jeter, North Carolina State College; Grady Stiles, *Caller and Times*; and John Holmes, KATV station, Arkansas.

The National Cotton Council had also arranged for interviews with authorities on subjects related to insect control. The following reports were presented at the 2-day meeting.

"Problems Needing Expanded Cotton Insect Research"—K. P. Ewing, Cotton Insect Section, USDA.

"Promising Developments In Insecticide Research"—R. L. Metcalf, University of California.

"Progress Report On Pink Bollworm Research"—Dr. F. C. Bishopp, Pink Bollworm Research, Brownsville, Texas.

"Utilizing Press, Radio and Television In Cotton Insect Control"—Eugene Butler, *The Progressive Farmer*.

"Systemic Insecticides"—H. T. Reynolds, assistant entomologist, Riverside, California.

"Insect Control In the Far West"—R. C. Dobson, entomologist, New Mexico Extension Service.

"Significant Provisions of the Miller Bill"—Dick Boths, member legislative committee, National Agricultural Chemicals Association.

## Meeting Calendar

Dec. 1-3—Wyoming Weed and Pest Conference, Agricultural Building, Univ. of Wyoming, Laramie.

Dec. 2-3—Beltwide Cotton Insect Control Conference, Adolphus Hotel, Dallas, Tex.

Dec. 5-8—Agricultural Ammonia Institute, Jung Hotel, New Orleans.

Dec. 6-9—Entomological Society of America, Rice Hotel, Houston, Tex.

Dec. 6-9—N. Cent. Weed Conference, Gardner Hotel, Fargo, N. D.

Dec. 7—Executive Committee Meeting, Fertilizer Section, N.S.C., at Spencer Chemical Co., Memphis, Tenn.

Dec. 10-11—Utah State Horticultural Society, annual convention, Hotel Utah, Salt Lake City.

Jan. 3-7—Annual Agricultural Conference, Purdue Univ., Lafayette, Ind.

Jan. 4-5, 1955—Pesticide School, N. Carolina St. College, Raleigh.

Jan. 5-7—Northeastern Weed Conference, Hotel New Yorker, New York.

Jan. 6-7—Nebraska State Weed Conference, Hotel Lincoln. Chemical and equipment exhibits included.

Jan. 9-12, 1955—Middle States Garden Supply Show, Hotel Sherman, Chicago.

Jan. 14—American Society of Agronomy, Mississippi Section, State College, Miss.

Jan. 17-19, 1955—Cotton States Branch, E.S.A., Tampa Terrace Hotel, Tampa, Fla.

Jan. 17-19—Southern Weed Conference, Soreno Hotel, St. Petersburg, Fla.

Jan. 31-Feb. 3, 1955—Eastern States Garden Supply Show, 71st Infantry Regiment Armory, New York.

Jan. 20-21—Chemical Market Research Assoc., joint meeting with Commercial Chemical Development Assoc., Edgewater Beach Hotel, Chicago.

Feb. 7-9—Association of Southern Agricultural Workers, annual meeting, Louisville, Ky.

Feb. 23-25—Use of Aerial Equipment in Agriculture, 4th Annual conference, Purdue Univ., Lafayette, Ind.

March 7-9, 1955—National Agricultural Chemicals Assoc., Spring Meeting, Chase & Park Plaza Hotel, St. Louis, Mo.

Mar. 24-25—N. Cent. States Branch, E.S.A., East Lansing, Mich.

## APFC-National Grange Sponsor Contest

The 1954 essay contest on "Building Fertility to Cut Farm Costs," sponsored by the National Grange and the American Plant Food Council, was concluded with the presentation of \$500 first prize to D. C. Faulkner, 14 (center), Kenton, O. APFC Secretary Louis H. Wilson (right) presented the award for the Council, as H. D. Newson (extreme right) National Grange looks on.



## Ward Addresses Agricultural Engineers

**G**REATLY increased use of airplanes in American agriculture was predicted by Robert N. Ward, Sales Manager for Central Aircraft Inc., Yakima, Washington, in a talk "The Impact of the Airplane on Agriculture" delivered before the recent annual meeting of the Pacific Northwest Society of Agricultural Engineers in Spokane, Washington. Mr. Ward predicted an expanded field of operations for the custom sprayer in connection with raising of livestock, improving pasture lands through brush killing and fertilizing by air. Such an expansion in custom spraying operations, he recalled, was just getting started a few years back when a drop in price of cattle interrupted the growing trend. Now, however, he believes that a combination of brush killing by air and fertilizing by air can be shown on a dollars and cents basis to put the cattle farmer definitely in a better competitive position for the food dollar. Oddly enough, he commented, the United States is lagging behind a number of other countries in use of agricultural aircraft. New Zealand, for example, is way ahead of the United States in utilizing airplanes for fertilizing pasture—they applied about 250,000 metric tons of fertilizer this year alone.

Mr. Ward predicted that in the very near future we may expect to see much larger aircraft used for custom spraying work. Sizable aircraft

will never be efficient, of course, for spraying small areas of truck crops, but in range work, grasshopper work, soil binding in dust areas, wheat spraying in large acreages, fertilizing, etc. larger aircraft the size of the B-17 will find expanding use. Mr.

Ward further predicted increased use of aircraft in reclaiming dust bowl areas. They are admirably adapted for this work, he indicated, for two reasons—their speed in covering large areas, and the fact that they do not cut up the ground and help erosion along. The airplane, he predicted will see greatly increased use in the next several years in spreading chemical binders on dust soils, seeding them and so on.

Summarizing the present status of the custom spraying field, Mr. Ward noted that today one acre in every six cultivated in the United States is treated by air with dust, spray, pellets or other kinds of chemical. Dusting and spraying firms operate more than 7,000 aircraft in the United States alone—10 times the size of our airliner fleet. Aerial pest control, weed control and fertilizing add an estimated \$3,000,000,000 to farm income each year either by saving the

(Continued on Page 106)

## Application Equipment Discussed at Ithaca

**T**HE Sixteenth Annual New York State Insecticide and Fungicide Conference and the Seventh Annual Pesticide Application Equipment Conference were held at Bibbins Hall of the Cooperative GLF Exchange at Ithaca, New York, November 9, 10, and 11, 1954.

As in previous years the conferences sponsored by the Departments of Agricultural Engineering, Plant Pathology and Entomology of the Geneva and Ithaca Stations of Cornell University, presented the results of research with pesticidal chemicals and application equipment and gave recommendations for the control of diseases and insects in 1955 on fruit, vegetables, potatoes, nursery, greenhouse and ornamental crops, and forage crops. A similar presentation for insect control on farm livestock reviewed both research of the current season and recommendations for next year. The status of soil fumigation for golden nematode control received attention. Research and extension personnel of the five sponsoring de-

partments made the presentations.

Guest speakers included Mr. Frank Irons of the U. S. Department of Agriculture, Agricultural Engineering Research Section of Toledo, Ohio who gave an illustrated talk dealing with experiments conducted by his laboratory and cooperators with low gallonage spraying equipment on field crops. Dr. A. D. Pickett of the Entomology Branch, Science Service Laboratory, Canada Department of Agriculture, Kentville, Nova Scotia, discussed the growing problems of need for compatibility of natural or biological control with chemical control measures, under the title "Are Modified Spray Programs Practicable?" Dr. Pickett drew upon his many years of experience in fruit pest control in Nova Scotia to show that under their conditions, modified programs are valuable to the growers.

In another timely discussion of "Antibiotics and the Control of Fruit Diseases," Dr. John C. Dunegan, U. S. Department of Agriculture

(Continued on Page 106)



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## Fertilizer Tonnage Down

American farmers used a slightly smaller tonnage of fertilizer in the year ending July 1, 1954, than in the previous 12 months according to an announcement by the National Fertilizer Association. Association officials point out, however, that consumption of the plant foods—the active ingredients in fertilizer—probably was somewhat greater in 1953-54 than during the previous year, thus setting a new all-time record.

Total consumption in the United States of all kinds of fertilizer during 1953-54 was 20,290,549 tons as compared with 20,603,448 tons in 1952-53. This represents a decrease in tonnage of 1.5 percent. The apparent leveling-off of fertilizer consumption this last year is attributed by the Association to various factors including drought over wide areas of the country, planting restrictions on major crops, and reduced farm income due to lower prices for farm commodities.

Regionally, consumption on a tonnage basis increased only in the West North central and far Western areas. The South Atlantic region, with the largest total consumption, showed the greatest decrease tonnage-wise with a drop of nearly 300,000 tons, or about 4 per cent. Consumption in the West North Central region was over 200,000 tons, or 11.5 per cent, greater than a year earlier.

## Fertilizer Consumption By Regions

	1952-53	1953-54
New England	430,282	404,565
Middle Atlantic	1,543,639	1,476,000
East North Central	4,193,512	4,089,631
West North Central	1,804,876	2,013,303
South Atlantic	6,941,602	6,655,582
South Central	4,334,752	4,229,948
Western	1,354,785	1,421,520
UNITED STATES	20,603,448	20,290,549

## N. J. Horticulturists Meet

New Jersey fruit and vegetable growers were to meet at the Hotel Claridge, Atlantic City, N. J., Dec. 6-8, in connection with the annual meeting of the New Jersey Horticultural Society. The program included an address on how national farm policies affect fruit and vegetable growers in New Jersey by Dr. Kenneth Hood, American Farm Bureau Federation, Washington D. C. The annual business session and election of officers was to take place December 7th, the meeting concluding with a banquet that evening.

## Industry-Agronomists to Chicago

The annual joint meeting of midwestern agronomists and fertilizer industry representatives at the Palmer House, Chicago, February 17 and 18, 1955 will feature a round table discussion of ways to cut cost of production of corn, wheat, and other small grains, and forage crops this would make-up one half day of the program. Reports of specific research results and a report of new



developments in fertilizer technology for the benefit of the college men will be discussed also. The meeting is sponsored by the Middle West Soil Improvement Committee.

Dr. F. W. Smith of Kansas State College will be chairman of the meeting. H. S. Vorhes, president of the Middle West Soil Improvement Committee and Z. H. Beers, executive secretary will welcome the soils men and visitors.

Because of the steadily increasing importance of the meeting, the better part of two days will be devoted to the program rather than scheduling the whole session for one day as in the past. Preceding the joint meeting, the agronomists will attend a series of two day meetings of the North Central Soils Research Committee.

#### **New Fert. Plant for Columbia River in N. W.**

A new \$12 million agricultural chemical and fertilizer plant, one of the largest in the West, will be in production early next fall.

The new facility is being built for Columbia River Chemicals, Inc., on a 50-acre site fronting the Columbia River, 13 miles south of Pasco, Wash. The site has been leased from the Walla Walla (Wash.) Port Commission.

Output of the plant, once it gets into production will be more than 400 tons per day of anhydrous ammonia, urea and ammonium sulphate for both agricultural and industrial purposes. The bulk will go to agricultural uses.

The operating company, Columbia River Chemicals, has been incorporated in Washington at least partly by Canadian principals. W. R. McRae and A. F. D. Short, of Calgary, Sask., said the new firm will employ more than 200 persons.

Engineering and construction is being done by the Fluor Corporation, of Los Angeles. Leveling of the plant site has begun, as well as construction of a 650-foot dock and dredging of a channel.

Next spring actual construction of building and machinery will get under way, with completion scheduled for August, 1955. Approximately 500 men will be in the construction crew, contractors said.

Primary market for the fertilizer produced by the new plant will be one of the richest in the nation—the new Columbia Basin irrigation project and the vast wheat lands of eastern Washington, eastern Oregon and northern Idaho. The entire agricultural output of the plant, for domestic use, has been contracted by the Pacific Supply Cooperative, of Walla Walla.

Plans are being drawn to market the plant's output in foreign areas and in the middle west, also. Company representatives point out that the plant will have very favorable transportation facilities because of its location. Barges can be loaded at the plant and towed directly to coastal or other river points in the U. S. Eventually, when the new Dalles dam on the Columbia is complete, ocean freighters will be able to dock and load directly at Pasco and Walla Walla.

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## ESA Annual Meeting in Houston

**A** REPORT on free trade by H. H. Ross, E. S. A. President, was scheduled to open the program of the second annual meeting of the Entomological Society of America being held December 6-9 at the Rice Hotel, Houston, Texas. A registration smoker for early arrivals was planned for Sunday evening, December 5th. Technical reports were on the agenda for December 6-9 and the annual banquet

was scheduled for Tuesday evening, December 7th. The Southwestern Branch, E. S. A. planned to hold short business meetings on December 6th and 9th, directly after the business sessions of the National Association.

In recognition of the Centennial of Professional Entomology, Dr. Roger C. Smith, retired Kansas entomologist, and Dr. P. J. Chapman, N. Y. Experiment Station, Geneva, N. Y. were

featured to address the membership on Monday, December 6th, with discussions of "Entomology and its Accomplishments" and "Entomology and its Future", respectively. Other reports on the program include the following:

**Monday, Dec. 6**

"The Systemic Entomology of Species, Subspecies and Physiological Races."

"An Evaluation of Ultra-violet-light Traps." Includes talks in the use of such traps in their engineering aspects, as survey instruments, and as a control measure.

"Systemic Insecticides for control of Insect Pests of Animals."

"Arthropod Transmitted Virus Diseases in Trinidad, B. W. I., with Special Reference to Yellow Fever". Dr. Wilbur D. Downs, Rockefeller Foundation.

**Tuesday, Dec. 7**

"The Ecological Approach to Management of Insect Populations." J. H. Pepper, Montana State College, Bozeman, Montana.

"The Need for Common Sense in Controlling Insect Pests." Lester English, Illinois Natural History Survey, Champaign, Ill.

"Research on Arthropods and Arthropod-borne Diseases in Africa." Harry Hoogstraal, U. S. Naval Medical Unit No. 3, Cairo, Egypt.

"The Interrelations of Biological Control and Taxonomy." C. W. Sabrosky, Entomology Research Branch, Washington, D. C.

Round table discussion by panels on "Training for the Professional"; "Training for the Non-Professional" and on "Textbooks in Entomology."

**Section of chemical control:**

"Status of Analytical Methods with Respect to the Determination of Mineral Quantities of Insecticides". R. H. Carter, Entomology Research Branch, Beltsville, Md.

"A New Bioassay Method for Evaluation of Insecticide Residues." H. P. Burchfield and Albert Hartzell, Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

"Effects of Insecticides on Taste and Quality of Food Crops." V. R. Boswell, Horticultural Crops Research Branch, Beltsville, Md.

"Developments in Phosphate Insecticide Research." Rosmarie von Rumker, Chemagro Corp., New York.

**Wednesday, Dec. 8**

"Florida Investigates the Biology of *Aedes taeniorhynchus*". M. W. Provost, Florida State Board of Health, Jacksonville, Fla.

"Trapping of Insects".

**Thursday, Dec. 9**

Panel discussion on Corn Earworm.

Arrangements for the meeting were directed by A. J. Garon, Jr., Houston. The program committee included chairman, William R. Hors-



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fall, University of Illinois; C. C. Alexander, Geigy Co., and R. C. Bushland, U. S. Entomology Research Branch.

### Western Cotton Meet in March

The Western Cotton Production Conference has been scheduled for March 8 and 9 at Hotel Westward Ho in Phoenix, Ariz. This is the fourth in a series of such meetings, though it wasn't till last year that the name Western Cotton Production Conference was officially adopted.

The meeting is sponsored cooperatively by the Southwest Five-State Cotton Growers Association, the Arizona Cotton Growers Association, and the National Cotton Council. It is intended primarily to provide growers with up-to-date information on best methods of producing cotton in California, Arizona, New Mexico, the El Paso area of Texas, and Nevada. However, many representatives of the chemical industry, land-grant colleges, USDA, and vocational agriculture also are expected to attend.

### Mass. Observes Centennial

The Centennial of Professional Entomology was commemorated in a program arranged by the Massachusetts Centennial Committee in cooperation with the New England Pest Control Association early in October at the Sheraton Hotel, Worcester, Mass. Included in the program was a report on "Massachusetts—It's Role in the First 100 Years" by Charles P. Alexander and a discussion on the future of entomology by Ashley B. Gurney. Ralph E. Heal, executive secretary NPCA, presented a report on "An Appreciation from Industry."

In a succeeding program, entomologists visited the Waltham Field Station which is under the direction of Professor W. D. Whitcomb and J. R. Garrett. Exhibits were shown of equipment for insect control and several reports were presented discussing mosquito problems, termite control, port inspection, etc. Some 100 persons participated in the program.

### Niagara Names Mason



Niagara Chemical Division, Food Machinery and Chemical Corp., Middleport, N. Y. announced recently the appointment of Dr. Curtis L. Mason to the position of assistant sales manager.

### New Personnel for ACP

American Chemical Paint Co., Ambler, Pa., has added three new members recently to its staff of research specialists. They are Dr. L. W. Melander, project leader, research development, Richard A. Fosse, western representative of the agricultural

chemicals division, research and development department, and John E. Gallagher, research specialist.

Dr. Melander was plant pathologist for the U. S. Department of Agriculture pest control branch and established a program for eradicating native barberries with hormone-type chemicals. Mr. Fosse worked with Monsanto Chemical Co. for three years on the development of herbicides and has served as a county weed supervisor. Mr. Gallagher was graduated with a B.S. degree in agronomy in June from Pennsylvania State University where he worked as an aide to Professor H. B. Musser, specializing in crab grass control.



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## Farm Equipment Institute Meets

By H. H. Slawson

THE Farm Equipment Institute at its recent 61st annual convention in Chicago, decided, among its other activities for 1955, to continue promotion of the cooperative educational program on pesticides and applicator equipment initiated in 1954 by an inter-association council composed of the Institute, the National Agricultural Chemicals Association and the National Sprayer and Duster Association. Details of the 1955 program were discussed at a luncheon meeting of the Institute's power sprayer and duster committee, during the convention, reports Robert A. Jones, executive secretary of the Institute.

This past year's activities included preparation and release to equipment dealers of a poster and a merchandising booklet on how to sell pesticides and applicator equipment. In view of the reception given this material, a new poster is to be prepared for use in 1955, it was decided, and articles slanted to the farmer's interest in use of pesticides and equipment will also be made available to the farm press. These, it was announced, will be prepared by an authoritative former member of the USDA, E. R. McIntyre.

The committee also discussed possibilities for developing statistics on production and shipping of pesticides and related equipment more extensively than presently available.

Economic conditions affecting agriculture were examined at length by various speakers during the three-day convention, with considerable reason found for optimism as to the future. In the face of the third consecutive year of lower farm prices and income, farmers in 1954 again restricted their purchases, but the belief was expressed that conditions are becoming stabilized.

Bruce Lourie, vice president, Deere & Co., forecast that "Farm machinery business next year has a

good chance of being about the same as in 1954." Competition among manufacturers has increased, Mr. Lourie said, resulting in introduction of more improvements and new models in 1954 than at any previous time during the post-war period.

### 12 M. Fert. Plant in Italy

A new twelve million dollar fertilizer plant is to be constructed in Barrancabermeja, Italy, for Industria Colombiana de Fertilizantes S. A. Plans call for daily output of 50 tons of ammonia, 150 tons of nitric acid, 65 tons of ammonium nitrate and 35 tons of urea. Studies preparatory to the decision to construct the plant were made by Chemical Construction Corp., New York. Contract for design and construction has been awarded to Montecatini.

### Stauffer Ups Fertilizer Output

Stauffer Chemical Co. has announced a million dollar expansion program to increase output of fertilizer at its plants at Vernon and Richmond, Calif. First step in the program will be a new plant at Vernon, adjacent to the company's present plant. The new plant will employ a special process developed by Stauffer to produce granular, dust-free pellets. Output will be some 500 tons a day of pelletized superphosphate and other modern ammonium phosphate fertilizers. Wilson & Geo. Meyer & Co., San Francisco, will act as exclusive sales agents for these new products.

### New Illinois Fertilizer Plant

The Illinois Farm Supply Co., Tuscola, Ill., on which construction was started in June of this year, will produce "Glo-Flo" mixed plant food in granular form, using a manufacturing process developed at the Tennessee Valley Authority's pilot plant. Expected capacity of the plant is estimated at 50,000 tons per year. Pro-

vision has been made for possible future expansion, if and when additional manufacturing capacity is needed. Adjacent to the Tuscola plant is the National Petro-Chemicals Corp. which will supply sulfuric acid and nitrogen solution used in the fertilizer manufacturing process.

### W. Phosphate Expands Output

John Paul Jones, vice president and general manager of Western Phosphates, Inc. Garfield, Utah, has announced expansion plans which will result in doubling the capacity of the company's phosphoric acid production unit. Cost of the expansion will run between \$250,000 and \$500,000 and will put production of pelletized fertilizer at this plant at about 135,000 tons annually when completed next spring. Production of triple superphosphate and ammonium phosphate will be increased by about 50%. Present production is at the rate of 90,000 tons per year.

### Neb. Weed Conf. Jan. 6-7

The Nebraska State Weed Conference will be held in the Hotel Lincoln, Lincoln, Nebraska, January 6 and 7, 1955. Exhibits of control material and equipment will be held in conjunction with the conference.

### Antara Transfers Nunn

Dr. L. G. Nunn of the Antara Chemicals Division of General Aniline & Film Corp., has been transferred from the Technical Department in New York to the Chicago, Ill. office where he will be field representative. O. G. Carpenter, who has been field representative in Antara's Chicago office, transfers to New York where he will be assistant market manager for the Antara Chemicals Division.

### Irving to USDA Post

George W. Irving, Jr. was recently named deputy administrator in charge of research for the USDA. In this position, Dr. Irving will coordinate investigations of the 16 branches, including many fields of agricultural science.

## MWSIC Re-elects Vorhes, Newman as Pres. and V. Pres.



**A**TTENDANCE passed the 200 mark at the Middle West Soil Improvement Committee's annual meeting November 4, at the LaSalle Hotel in Chicago. H. S. Vorhes, Virginia—Carolina Chemical Corp., Dubuque, Iowa, was re-elected president for the 1954-55 term; W. M. Newman, Price Chemical Co., Louisville, Kentucky, was re-elected vice president, and R. G. Fitzgerald, Smith-Douglass Co., was elected treasurer.

Directors chosen for 3-year terms are: Kirk Wagenseller, Swift and Co., Cleveland, Ohio, re-elected; W. M. Newman, re-elected; D. Williams, Minnesota Farm Bureau Service Co., St. Paul, and George Kingsbury, Kingsbury & Co., Indianapolis.

Z. H. Beers, MWSIC executive secretary, presented the annual report summarizing the committee's 1954 educational program and detailing plans for new and expanded activities in 1955. He cited results of the committee's 1954 educational program in newspapers, farm magazines, and via radio stations, film strips and illustrated folders. He also reported on fertilizer research projects which the committee sponsors at nine Midwestern agricultural colleges, on field work during the year and on contacts and cooperation with agronomists.

Mr. Beers said that with the addition of Charles E. Trunkey to the staff, expanded activities will be launched in 1955. Among these will be the development of illustrated and text material for TV; the preparation of new color folders on building crop yields per acre, cutting costs and increasing profits by the use of fertilizer; the release of new color film strips to vocational agricultural teachers, schools, county agents and farm

**Right Photo:** (L to R): R. G. Fitzgerald, Smith-Douglass Co., treasurer; and Z. H. Beers, Middle West Soil Improvement Committee.

**Left Photo:** (L to R): W. B. Copeland, Smith Douglass Co.; Mr. H. S. Vorhes, Virginia-Carolina Chemical Co., president MWSIC; W. M. Newman, Price Chemical Co., vice president.

groups; and increased contact with agronomists in gathering and processing material for educational use.

### Va. Carolina Names Barton



William D. Barton, Jr., former manager of the Shreveport, La. sales office of Virginia-Carolina Chemical Corp., has just been transferred to manager of the Montgomery, Ala. office. James R. Campbell has been named to succeed Mr. Barton as manager of Shreveport. Mr. Barton has been with V-C since 1944, and manager of the Shreveport office since 1951. He replaces M. J. Simpson who recently resigned as manager of the Montgomery office. Mr. Campbell joined V-C at Shreveport in 1949 and was named assistant manager of the Shreveport sales office in 1951.

### Miss. Insect Control Conf.

The first Mississippi Insect Control Conference will be held at Mississippi State College on January 6 and 7. Panel discussions the first day will review control of insects on small grain and pastures, livestock, vegetables and fruit.

Subjects of panels the next day will be regulatory; relations between research, extension and industry; application methods and problems; and factors and causes of insect control failures.

Other highlights of the conference will be an outline of the federal

research program on forest insects by L. W. Orr, chief, Division of Forest Insect Research, New Orleans, La.; a review of important insect pests of the state, and the latest information about cotton insects and their control.

Members of the committee planning the program for the event are A. G. Bennett, extension entomologist, State College; L. H. Moseley, district extension agent, Stoneville; J. F. White, Shell Chemical Co., Jackson; Norman Downey, Hercules Powder Co., Birmingham, Ala.; and Dr. M. E. Merkl, federal entomologist, Stoneville.

### NH<sub>3</sub> Transportation Barge

Bethlehem Steel Co., Beaumont, Tex., recently launched a barge for the transportation of anhydrous ammonia as part of a program sponsored by the Shell Chemical Corp. The barge has an overall length of 252 feet and a capacity of 1,680 tons. The ammonia will be carried under pressure in seven underdeck and two on-deck tanks. The barge will be used to transport ammonia from Shell's plant at Pittsburgh, Calif. to a new Shell terminal at Portland, Ore.

### Des Moines Fert. Plant

The City Council of Des Moines, Iowa, has recently approved transfer to Sidney C. Levine and Robert H. Bush, attorneys, of the contract for purchase of sludge from the city's sewage treatment plant. Subsequent renovation of the plant is expected to give a sufficient increase in the quantity of sludge which the plant will produce so that production of fertilizer from the sludge will become commercially feasible.

### Bradley Baker Named Rep.

Mississippi River Fuel Corp., St. Louis, Mo., has named Bradley and Baker of New York to sell its ammonium nitrate, anhydrous ammonia and nitrate solution. The chemical division will be known as Mississippi River Chemical Co., and its plant is being built by Fluor Corp. at Selma, Mo. Production is expected during the fall of 1955.

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## Washington Assn. Reviews New Herbicides

**H**ERBICIDES may be in for a new era of harmony and understanding in Washington, where some of the bitterest legal battles about 2,4-D have been fought in recent years. At least that is the impression left by the 1954 session of the Washington State Weed Association, meeting in Yakima, Oct. 30. Although 2,4-D, 2,4,5-T and a host of new herbicides were discussed at length, there was none of the angry debate which has marked past gatherings of the group.

Grape growers and wheat men, who had been antagonists in the past

on the herbicide question, spoke on the same panels, and in a manner surprising and encouraging to most of the group. "As a whole, grape growers are not in favor of outlawing 2,4-D on a state-wide basis," said Oren Dayton, manager of the Welch Grape Juice company in Kennewick. "We realize herbicides have a tremendous importance in the wheat raising industry. We want only to cut damage to our own crops . . ." Dayton said the 1,300 grape growers in Washington are holding fast to this live-and-let-live

attitude, even though 2,4-D damage showed up again this year.

Wheat men, most of whom use 2,4-D in large quantities in Washington, must assume some of the blame for past difficulties in the use of 2,4-D, according to Chester Stonecipher, wheat and pea rancher from southeastern Washington. "Many of us have been careless in the handling of spray rigs or in mixing, or leaving equipment around to create fumes," he told the meeting. "We must be more careful of other people's crops."

Auburn Norris, state weed supervisor, told delegates that complaints of 2,4-D damage had been "fewer and farther between this year than in any of the past few years, even though commercial applicators have sprayed 435,000 acres of weed-infested land in the state so far this year."

There was no recurrence, this year, of damage which resulted in some wheat after spraying with 2,4-D during the 1953 season, according to Dr. Lowell Rasmussen, weed specialist from Washington State College. Experts said the malformed wheat and damaged heads which appeared in some sprayed fields in 1953 apparently were the result of slight 2,4-D shock coupled with highly unusual growing conditions. Such damage was noticeably lacking this year, Dr. Rasmussen said.

The association voted to meet in Tacoma next year, on October 26 and 27. A. W. Lange, Spokane county wheat farmer, was elected president for the coming year.

### Hudson Regroups Sales Div.

A realignment of its multiwall sales force was announced last month by the Hudson Pulp & Paper Corp., New York. The move makes no change in Hudson personnel, but rather involves a reassignment of duties, requiring that each salesman concentrate his efforts in a single product division.

Hudson announced also the advancements of W. N. Cromwell to eastern sales manager with headquarters in New York, and B. C. Drumm as western sales manager with headquarters in Chicago.

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### New Atlas Plant in Canada

The Atlas Powder Co.'s new esterification plant in Brantford, Ontario, began production early in October. The new plant is producing Atmul 82, a mono and diglyceride emulsifier, and has facilities to produce ester type emulsifiers used in the insecticide field. R. T. Vanderbilt Co. will distribute the Atmul products.

### Ag. Inst. Elects Clifton

Dr. L. E. Clifton, associate director of research of the research & development department of Continental Can Company's Metal Division, has been elected vice president of the Agricultural Research Institute. The Agricultural Research Institute was organized two years ago to provide a forum for discussion of the potentialities of research in development of the nation's agricultural resources. The group held its annual meeting early in October in Washington, D. C.

### Dupont Advances Dale Wolf

Dale E. Wolf has been named manager of the agricultural chemicals research section of Du Pont Company's Grasselli Chemicals Department. He succeeds the late Dr. Harry F. Dietz who died recently. Dr. Wolf joined Du Pont early in 1950 and since August of that year has been assistant manager of the agricultural chemicals research section. Dr. Wolf is co-author of the book "Principles of Weed Control."

### F. M. C. Realigns Research

Food Machinery & Chemical Corp., San Jose, Calif., has announced a series of changes in research activities formerly performed by the company's Central Research Department in San Jose. The San Jose research group's chemical activities have been transferred to the laboratories of FMC's Chemical Divisions. Administrative offices of these divisions are in New York City.

Various additional segments of the company's Central Research Department engaged in research work other than chemicals, also have been

aligned with appropriate FMC manufacturing operations.

Paul C. Wilbur, FMC vice president and director of research, stated that the realignment project is part of management's program to intensify FMC's technical research activities on a company-wide basis. Most of the qualified key personnel previously engaged in chemical research at San Jose under Government defense contracts are being transferred to the research groups of FMC's Chemical Divisions.

### Potash Plant in N. Mexico

Plans to develop 13,000 acres of potash land in southeastern New Mexico near Artesia were announced recently by the National Farmers Union and Kerr-McGee Oil Industries, Inc. Tentative plans call for creation of a new corporation jointly financed by NFU and Kerr-McGee, which will construct the mining plant and then distribute and market the potash. Estimated value of the land controlled by the farm union is \$120,000,000.

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AGRICULTURAL CHEMICALS

### NC Pesticide School Jan. 4-5

North Carolina State College of Agriculture and Engineering will conduct its seventh annual Pesticide School January 4 and 5, 1955 in the College Union Building at North Carolina State College. Among topics to be discussed are the following: Safety with Pesticides; Herbicide Research Results; Effects of Pesticides on Fish and Wildlife; Results with Antibiotics Against Plant Diseases; Changes in Control Recommendations for 1955; Results of 1954 Soil Fumigation Tests; New Developments in Application Equipment. L. S. Hitchner, secretary of NACA will address the group at the January 5th session, discussing the effects of the Miller bill on the pesticide industry.

### Pennsalt To Buy Thomas Fert.

Pennsylvania Salt Manufacturing Co. has announced that it has been negotiating with I. P. Thomas & Son Co. of Camden, New Jersey with a view to merging the Thomas organization as a new operating division of Pennsylvania Salt Manufacturing Company through a stock transfer plan. The proposed merger has since been acted on affirmatively by Thomas share holders.

"I. P. Thomas Co. will continue to be prominently identified with the fertilizer field," said George B. Beitzel, president of Pennsalt, "but its facilities for the production of basic materials will now be made available to Pennsalt." Included are the I. P. Thomas facilities for production of phosphoric acid as well as additional plant capacity for production of sulphuric acid.

I. P. Thomas & Son Company was established in 1868. Its plant is located in Paulsboro, New Jersey. The Thomas plant will now become the twelfth in Pennsalt's coast-to-coast organization.

### Horace Graham Dies

Horace R. Graham, former president of the Anglo-Lautaro Nitrate Corporation died November 8th at LaGuardia Airport, New York as he was returning from a trip. Mr. Gra-

ham had been president of Anglo-Lautaro from 1945 until his resignation in July of this year. He was 68.

### Fertilizer Plants in Mexico

Three fertilizer plants with a production capacity of 600,000 tons annually will be established on the Isthmus of Tehauntepec near Coatzacoalcos, in Sonora and in the Matamoros. The plants are to be built with combined Mexican and United States private capital. United States concerns interested in the concession for the project, according to banking officials in Mexico, are the Mathieson Chemical Co., Phillips Petroleum Co., Shell Oil Co. and Union Carbide and Carbon Corp. The Mexican Government will decide which company will get the concession. Imports of fertilizers into Mexico are estimated at about \$12,000,000 annually.

### Utah Phosphoric Plant

Western Phosphates, Inc. announced recently plans to increase capacity of its Garfield, Utah phosphoric acid plant. A second concentrator is being installed which will permit the production of additional amounts of fertilizers.

### Barnard, WACA Secretary



Stanley W. Strew, president of the Western Agricultural Chemicals Association, announced recently the appointment of C. O. Barnard as secretary-treasurer to succeed the late W. D. Gray.

Mr. Barnard retired last spring under American Cyanamid's retirement plan, after 25 years of service. During 1931-32 he represented them in Egypt and Palestine as a specialist on citrus tree fumigation, and in December 1932 became district sales manager of a 10-state area for Cyanamid's Insecticide Department with headquarters in Kansas City, Missouri. In 1952 he was chief of technical surveys for Cyanamid's Agricultural Chemicals Division, in which capacity he made surveys of agricultural chemical markets in Mexico and the Pacific Coast States. In 1945 he moved to California as western sales manager for the insecticide department. During this time he became acquainted with many of those in the agricultural chemicals industry and among state and regulatory officials.

### Du Pont Sells NH<sub>3</sub> Plant

E. I. duPont de Nemours & Co., Wilmington announced recently that it will sell to National Ammonia Co., Philadelphia its anhydrous ammonia plant in North Philadelphia. The unit is equipped for loading, storing and shipping of cylinders of anhydrous ammonia. The sale will be effective December 31.

It is reported that Du Pont will continue manufacturing anhydrous ammonia, as in the past, at its Belle, W. Va. plant.

### New GAF Acetylene Plant

Ground breaking ceremonies for the new \$6,000,000 chemical plant of General Aniline & Film Corp. were held November 4th in Calvert City, Ky. The new plant, which is expected to be completed next year, will be the first installation in this country for commercial scale manufacture of chemical products developed from acetylene at elevated pressures. Engineering and construction work for the new plant will be directed by The Lummas Company, N. Y.

The products which will be available in commercial quantities are: propargyl alcohol, propargyl halides, 2-butyne-1, 4-diol, 1,4-butane-diol, butyro-lactone, 2-pyrrolidone, n-pyrrolidone, n-vinyl-2-pyrrolidone, and polyvinyl-pyrrolidone (pvp).

The commercial plant in Calvert City is based on the successful operation of the Company's pilot plant at Linden, N. J., which was erected in 1947. Pilot plant construction will be continued at Linden and new manufacturing processes will be tried there preliminary to the larger commercial scale production at the new plant in Kentucky.

### Potash Co. Appoints Appleton

The appointment of Shelton Appleton as sales representative for Texas, Louisiana, and a portion of Arkansas was announced recently by the Potash Company of America.

W. H. Appleton, southern sales manager for the Potash Company will continue to work with Mr. Shelton Appleton.



*New Wyandotte 75% Lindane is easier to apply to seed; helps assure healthier wheat.*

**Better protection for wheat seed!**

# New Wyandotte 75% Lindane

Here, at last, is a Lindane product that makes protection of wheat seed easier, surer! It's Wyandotte 75% Lindane—a special micronized product that permits more *uniform* treatment of wheat seed against wire worms, cut worms, grubs, seed corn maggots and other insect pests.

Wyandotte 75% Lindane works equally well in slurry or dusting methods. Used along with a chemical fungicide, it guards against both plant diseases *and* insects. Free flowing, chemically stable, safe and easy to handle. For samples and additional data, just drop us a letter.

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You'll find the Wyandotte line of basic agricultural chemicals the highest quality available anywhere; we've been supplying raw-material chemicals to industry for 64 years.

DDT (technical) • BHC (technical and high gamma; gamma-content guaranteed) • New 75% LINDANE (free flowing, readily slurried) • KREELON\* (alkylarylsulfonate

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Delivery is prompt—in the exact quantities you need—thanks to strategically located regional plants and warehouses. And our skilled service-scientists and modern research facilities are available to lend you helpful technical assistance.

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## Agricultural Ammonia Institute Meets Dec. 6-8



**Speakers at Convention.** left to right, top to bottom: E. Lipscomb, National Cotton Council; E. W. Thomas, AAI president; R. Coleman, NFA president; W. A. Albrecht, Univ. of Missouri; F. E. Bear, New Brunswick, N. J.; and Senator A. J. Ellender, Sr.

**T**HE Agricultural Ammonia Institute is preparing for an attendance of more than 1,000 at its fourth annual convention in New Orleans, December 6, 7, and 8. The convention and trade show of latest developments in the technical branch of the industry will be held at the Jung Hotel.

The Trade Show and regular convention activities will start Monday, December 6th, with morning registration, committee meetings and a luncheon with Jack F. Criswell, AAI executive vice president, presiding. At the luncheon, convention delegates will be officially welcomed to New Orleans by a representative of Mayor deLesseps Morrison.

Ed Lipscomb of Memphis, director of public relations and sales promotion for the National Cotton Council, will deliver the principal address. Monday afternoon, E. W. Thomas of Boonville, Missouri, Institute president, will deliver his message, and Dr. William A. Albrecht of Columbia, Mo., University of Missouri College of Agriculture, will report on "Fertilizer's Services in Plant Nutrition."

Tuesday's lineup of events includes talks by Dr. Russell Coleman, president of the National Fertilizer Association, and Senator Allen J. Ellender, senior senator from Louisiana. During the afternoon, delegates

will tour the \$50,000,000 Fortier ammonia plant of American Cyanamid Co. Tully W. Talbot of Audubon, Ia., AAI director, will preside over the midafternoon panel on Wednesday, and Dr. Firman E. Bear of New Brunswick, N. J., editor of *Soil Science*, and retired chairman of the Rutgers University Soils Department, will speak on "Some Facts About Nitrogen Fertilizers."

## N. J. Sta. Names Pathologist

Dr. Spencer H. Davis, Jr., associate professor of plant pathology for the New Jersey Agricultural Experiment Station since 1948, has just been appointed associate specialist in the Rutgers University Agricultural Extension Service at New Brunswick, N. J. In announcing the transfer, Dean W. H. Martin said that the Extension Service has long needed a program of educational work in the diseases of trees, field and vegetable crops, ornamental plants and flowers.

Research and resident teaching conducted by Dr. Davis on the diseases of ornamental plants will be taken over by Stephen Bachelder of Rowayton, Conn. Bachelder, who graduated from Rutgers in 1950 and obtained his master of science degree in plant pathology in 1952, has been assistant pathologist for the F. A. Bartlett Tree Expert Company of Stamford, Conn., for the past five months. His new title will be research associate in plant pathology. He has done research on hawthorn leaf spot control, peach tree diseases and boron deficiency of tomatoes. He is presently conducting research on the Dutch Elm disease.

### MONDAY, DEC. 6

**8:00 A.M. Registration**  
**9:30-12:00 Trade Show**  
**10:00-12:00 Committee Meetings**  
**12:00 P.M. Luncheon.** J. F. Criswell presiding  
 Welcome Address, Mayor deL. S. Morrison  
 "The Contemporary Jitters, Their Cause and Cure", E. Lipscomb, director of public relations and sales promotion, National Cotton Council, Memphis, Tenn.  
 "Fertilizer's Services in Plant Nutrition" W. A. Albrecht, University of Missouri, Columbia, Mo.  
**4:00 P.M. Business Session**  
**4:30-7:30 Trade Show**

National Fertilizer Association

"Agricultural Outlook for 1955"  
 Senator Allen J. Ellender, Sr., Houma, La.

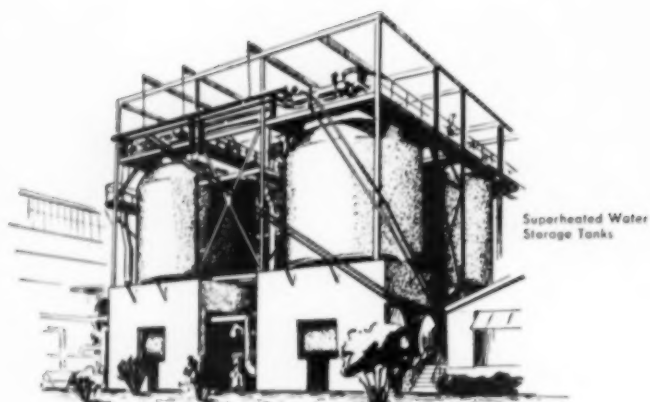
**1:00-5:00 Tour of American Cyanamid Co.'s NH<sub>3</sub> Plant**  
**4:30-7:00 Trade Show**

### WEDNESDAY, DEC. 8

**8:00 A.M. Registration**  
**9:00-12:00 Trade Show**  
**12:00 P.M. General Session**  
 Tully W. Talbot, presiding  
 Movie "Making the Most of a Miracle"  
 "Some Facts About Nitrogen Fertilizer"  
 Firman E. Bear, New Brunswick, N. J.  
 Panel Discussion, C. Bourg presiding  
**4:00 P.M. Business Session**  
**6:00-7:00 Friendship Hour**  
**7:00 P.M. Banquet and Entertainment**  
**Note: Trade Show closed during business sessions**

### TUESDAY, DEC. 7

**8:00 A.M. Registration**  
**8:00-10:00 Trade Show**  
**10:00 A.M. General Session.** R. L. Tilton, presiding  
 "Fertilizer . . . An Answer to our Crop Surplus Problem."  
 Russell Coleman, president,



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### New Arkansas Society

Industry representatives attending the fourth annual fertilizer school at Little Rock, Ark., October 22nd, organized the Arkansas Plant Food Educational Society, and elected W. Dunklin, Planters' Fertilizer and Soybean Co., Pine Bluff, president. Mr. Dunklin advised that the society will be concerned primarily with the direction of information on fertilizers and agricultural practices, etc., to members, farmers, etc. The society plans also to promote agricultural programs and cooperate with all agricultural agencies.

R. M. Morehead, Olin Mathieson Chemical Corp., Little Rock, was elected vice president and Lloyd Dhonau, Arkansas Plant Food Co., North Little Rock, was elected secretary-treasurer.

Directors elected for the Arkansas Plant Food Educational Society were: E. O. Baber, Chilean Nitrate Sales Corp., Little Rock; A. O. Haliman, Blytheville (Ark.) Fertilizer Corp.; N. D. Morgan, American Potash Institute, Shreveport, La.; Z. H. Calhoun, Southern Cotton Oil Co., Little Rock; R. L. Morgan, Arkansas-Missouri Plant Food Co., Corning, Ark.; R. M. Morehead, Olin Mathieson Chemical Corp., Little Rock; Douglas Kelly, Jr., Lion Oil Co., El Dorado, Ark.; Joe Wepfer, El Dorado Fertilizer Works; H. T. Ray, Armour Fertilizer Works, Memphis, and Max Vaughn, Fort Smith (Ark.) Cotton Oil Co.

### Calspray Canadian Subsidiary

California Spray-Chemical Corp., Richmond, Calif., announced recently the formation of a Canadian subsidiary, Ortho Agricultural Chemicals Ltd., with headquarters in Vancouver, British Columbia. Construction of a dust mill and warehouse in New Westminster, B. C., has been completed, where Ortho products will be formulated and distributed under the new company label.

At present, the new company's distribution will be limited to British Columbia and Alberta, but the company expects to service the entire Dominion as facilities are developed in

other provinces. The Green Valley Chemical Co., Ltd., in New Westminster has been named distributor for the two provinces. R. T. Wilson, secretary of Standard Oil of British Columbia, will act as Canadian executive officer of the new company.

### Two New VPs for Federal

Federal Chemical Company, Louisville, Ky., has announced the election of two new vice presidents.



J. R. Sargent



S. E. Shelby

John R. Sargent, Louisville, was elected vice president in charge of sales, and Sam E. Shelby, Nashville, was elected vice president in charge of production.

Mr. Sargent has been general sales manager of the company for the past eight years. Prior to that he directed sales at four of the firm's six sales divisions. Mr. Shelby has been general production manager for the past two years. He headed the company's engineering department prior to that time.

### Fertilizer Bank Loans Profitable

That bank loans for fertilizer are profitable to the farmer as well as the bank was proved by a recent survey of the People's National Bank, of Barre, Vermont, according to an article in the November issue of *Farm Journal*, Philadelphia. The loans of about 60 dairy farmers were checked against Dairy Herd Improvement Association records, and the farmers' returns averaged.

Farmers with the highest annual income over feed costs were spending \$17.36 per cow for lime and fertilizer. Farmers in the bank's "middle income" group spent an average of \$8.11 per cow per year for lime and plant food, while the farmers with the lowest return spent only \$7.11.

"The bankers are satisfied," says *Farm Journal*, "that better dairymen use the most lime and plant food."

### Plans Agricultural Plant

Plans of Electric Bond & Share Co. and United Gas Corp. to enter the petrochemical field by jointly financing a new firm, Gulf Chemical Co., provide also for possible participation of National Research Co. of Boston in the venture. The new Gulf Chemical Co., under the proposal now before the Securities and Exchange Commission, would build a \$22.9 million plant near Pensacola, Fla., to make industrial and agricultural chemicals.

### VGAA Conv. At Syracuse

The 46th annual convention of Vegetable Growers Assoc. of America, in cooperation with National Assoc. of Greenhouse Vegetable Growers, Empire State Potato Club, and N.Y. State Vegetable Growers Assoc., was held November 29-December 2 at Syracuse, N.Y.

Included in the three-day meeting were reports by the following: M. W. Meadows, Cornell University, Ithaca, who discussed "Recent Advances in Cultural Practices"; R. S. Dickey, Cornell Univ., Ithaca, reporting on "Potato Disease Control"; Robert Sweet, Cornell Univ., Ithaca, "Modern Weed Control Methods"; and W. A. Rawlins, Cornell, "New Developments in Potato Insect Control." A number of other papers were presented on the handling of vegetables, muck insects and handling muck crops, potato promotion programs, soil management, labor saving equipment, etc.

### "Na-Churs" Field Day

Some 300 growers from north central Ohio counties attended a field day on October 14th sponsored by the "Na-Churs" Plant Food Co., Marion, O., manufacturers of liquid fertilizer. Activities included visits to four farms in Delaware and Franklin counties where tests on corn have been under way this season under the direction of Dr. V. A. Tiedjens, director of research for the company. Airplane equipment used for foliage spraying was shown, as well as a ground sprayer and new equipment for applying liquid fertilizer with a corn planter.

# Mount Rainier...

*Mighty Monarch of the Pacific Northwest*

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Lee Merrill Photo



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In 1955 look to PENCO Brand Agricultural Chemicals to serve your needs. Top quality, field-tested PENCO products have a reputation of good quality and dependability. In the coming year, groomed to serve you even better, the Pennsylvania Salt Manufacturing Company of Washington will maintain Agricultural Chemicals manufacturing and sales facilities to cover the country from coast to coast.

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## Hold Anhydrous Ammonia Conf.

**S**OIL scientists from South Atlantic states exchanged experiences in the use of anhydrous ammonia as a direct application nitrogen fertilizer and determined lines along which additional research may be conducted at the South Atlantic Research Conference on Anhydrous Ammonia, October 26. Planned as the first of an annual series, the conference was sponsored by the Carolinas-Virginia Agricultural Ammonia Association, a regional group affiliated with the national Agricultural Ammonia Institute. It was held in Raleigh, N. C.

Host of the conference was the department of agronomy of North Carolina State College of which Dr. E. T. York, Jr. is the head and Dr. E. R. Collins is professor in charge of agronomy extension work.

Dr. Arthur M. Smith, chief agriculturist of Olin Mathieson Chemical Corp., Baltimore, as chairman of the program committee arranged a program dealing with all phases of anhydrous ammonia as a direct application nitrogen fertilizer. Approximately 200 college, station and extension agronomists and research representatives of ammonia and fertilizer producers and distributors participated in the conference.

In roundtable discussions, the group sought to determine what research is now in progress, what results and information have been obtained, what recommendations for use can be made, and what further research should be started.

Discussion leaders explained the reactions of anhydrous ammonia in the soil and the reactions by which it is retained and made available to crops. In a review of biological effects, the stimulation to soil bacteria and the reduction of fungus disease organisms and nematodes was explained. The conference clearly developed the need for even larger applications of nitrogen for corn and

cotton than most farmers in the South Atlantic States now use. Also, speakers brought out that anhydrous ammonia is giving farmers in the area as good results as other nitrogen fertilizers which sometimes are more expensive.

The opportunity for increasing the carrying capacity of pastures and the protein content of pasture grasses and hay was highlighted in a graphic presentation. The discussion pointed up particularly the difference in the ability of various Southern pasture grasses to make use of fertilizer nitrogen and the available amount of water.

Problems relating to the placement of nitrogen fertilizers applied to small grain were reviewed, as were those related to time and rate of application. In weighing the merits of preplant versus top dressing, speakers agreed that where the moisture content of the soil remains high during the late winter and early spring period, preplant applications may be preferred. In another discussion, the nitrogen requirements of the leafy vegetable plants were reviewed, along with the difficulties resulting from various times, rates and methods of application.

Throughout the discussions on the use of anhydrous ammonia, it was repeatedly emphasized that as the nitrogen applications per acre are increased, phosphorus, potash and lime applications should be correspondingly increased for the most profitable results.

The soil scientists who served as discussion leaders and their topics were: Dr. W. G. Blue, Florida Agricultural Experiment Station, Chemical Effects of  $\text{NH}_3$ ; Dr. Charles F. Eno, Florida Agricultural Experiment Station, Biological Effects; Dr. Emerson Collins, North Carolina Agricultural Extension Service, Corn; Dr. H. P. Cooper, South Carolina

Agricultural Experiment Station, Cotton; Dr. G. W. Burton, Georgia Coastal Plains Experiment Station, Pastures; Professor W. W. Lewis, Virginia Agricultural Extension Service, Small Grains and Grass Silage Crops; and Dr. E. M. Dunton, Jr., Virginia Truck Experiment Station, Vegetables.

Presiding was E. W. Thomas, Booneville, Mo., president, Agricultural Ammonia Institute. At a luncheon given by Olin Mathieson Chemical Corporation, that company's motion picture on anhydrous ammonia entitled "Bigger Acres," was shown. Conference arrangements were made by officers of the Carolinas-Virginia Anhydrous Ammonia Association: W. M. Campbell, Dixie Guano Co., Laurinburg, N. C., James C. Cook, Olin Mathieson, Williamston, N. C., and H. Alex Vann, Suburban Farm Service Co., Winston, N. C.

### Southern Workers To Meet

The 52nd annual meeting of the Southern Agricultural Workers will be held in Louisville, Kentucky, February 7, 8 and 9. Sectional meetings will be held in four different hotels. The agricultural engineers, agronomists, entomologists, phytopathologists and plant physiologists will meet at the Brown Hotel. The division of agricultural economics & rural sociology, agricultural editors, and animal husbandry will hold sessions at the Kentucky Hotel, while the horticulture division will hold meetings in the Seelbach Hotel, and the department of forestry will hold its sessions at the Watterson Hotel. A full program of the meeting will be presented at a later date.

### U. S. Group Seeks Control

Borax Consolidated, Ltd., British fertilizer and chemical firm, reports a United States group is interested in getting control of the company. It did not disclose the identity of the U. S. bidder.

Borax Consolidated owns borate mines in California and elsewhere as well as factories in the United States, Britain, France, Turkey, Austria and South America.

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## **ORTHO LINDANE** more than meets government standards

ORTHO Lindane 100 is actually purer than the minimum government standards—has a minimum gamma isomer of 100% . . . highest potency . . . combines effectiveness with economy.

### **Easy to formulate**

ORTHO Lindane is easy to handle and formulate as a spray or dust. The crystals are dry and free-

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ORTHO Lindane may be purchased in prepared formulations under the ORTHO brand name of ISOTOX. A variety of ISOTOX formulations in liquid, wettable and concentrate form is available.

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SCIENTIFIC PEST CONTROL  
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**AGRICULTURAL CHEMICALS**



Executive Committee, Northeastern Weed Control Conference, 1955: Standing, left to right: W. W. Smith, Chairman of Program Committee; Arne Carlson, Chairman of Forestry and Industrial Weeds Section; D. A. Schallock, Treasurer; C. L. Hovey, Chairman of Sustaining Membership Committee; L. L. Danielson, Chairman of Coordinating Committee. Seated, left to right: R. A. Peters, Chairman of Public Relations Committee; A. O. Kuhn, President; R. J. Aldrich, Secretary; J. D. Van Geluwe, Vice-President; R. H. Beatty, Chairman of Awards Committee.

### N. E. Weed Meeting in New York, Jan. 5-6

All aspects of weed control will be considered at the ninth annual Northeastern Weed Control conference scheduled to meet January 5, 6 and 7, 1955 at the Hotel New Yorker, New York City. Among the 500 or more persons attending will be producers of weed control chemicals and equipment, research personnel of state and federal experiment stations and commercial users.

Dr. A. O. Kuhn, University of Maryland, the president of the 1955 conference, has stated that the general pattern of the meetings will be

the same as that of previous years. Research findings on particular phases of weed control will be presented and discussed in sectional meetings. Included will be sections on horticultural crops and nurseries, agronomic crops and turf, forestry and industrial weed problems, public health and aquatic weed control. An extension section, inaugurated with considerable success at the 1954 meeting will be scheduled again this year. The proceedings of the conference, including all the papers given, will be available when the conference opens.

### APFC Approves Fertilizer Assn. Consolidation

WASHINGTON, D. C. Dec. 1. Plans to consolidate the National Fertilizer Association and the American Plant Food Council into a new association, The National Plant Food Institute, were approved by the members of the APFC at a special meeting held in Washington, today. Approval by the Council was the final action necessary in preparation for carrying out the consolidation plans, as members of NFA had already approved the plans at their meeting in Hollywood, Fla., Nov. 11. The boards of directors of both associations had approved the plans earlier.

Details of the consolidation were worked out by a joint committee of the two organizations, which will formulate a program for the new Institute. Members of this committee were: Ralph B.

Douglass, Norfolk; E. A. Geoghegan, New Orleans; J. A. Howell, Richmond; John A. Miller, Louisville; Edwin Pate, Laurinburg, N. C.; C. T. Prindeville, Chicago; Paul J. Prosser, Baltimore; John E. Sanford, Atlanta; J. E. Totman, Baltimore; and Louis Ware, Chicago.

These and the following will constitute a 36 man board of directors for the new organization: R. E. Bennett, S. Omaha; H. C. Fisher, Sandusky; W. B. Hicks, Jacksonville; B. H. Jones, Fresno; R. L. King, Valdosta; W. J. Murphy, New York; W. T. Steele, Jr., Richmond; M. S. Wright, Nacogdoches; E. N. Carvel, Laurel, Del.; J. V. Collis, Louisville; J. C. Crissey, Ithaca; J. H. Epting, Leesville, S. C.; R. L. Hockley, Baltimore; R. D. Martenet, Indianapolis; G. E. Pettitt, Washington; Hugo Riemer, New York; J. B. Snyder, Topeka; W. C. Stark, Riverhead, N. Y.; J. F. Doetsch, New York; G. W. Gage, Anderson, S. C.; M. G. Geiger, Baltimore; E. R. Jones, Waterbury; J. E. Powell, Columbus; C. B. Robertson, Norfolk; M. C. Taylor, Seattle; and F. J. Woods, Tampa.

### CFA Hears Report by Lemmon

Among the speakers at the recent annual meeting of the California Fertilizer Association, held Nov. 15 and 16 at Coronado, Calif., was Dr. Allen B. Lemmon, Chief, Bureau of Chemistry, Calif. Dept. of Agriculture. Dr. Lemmon reported that fertilizer consumption in the state continued to increase this year, with 1954 being about 2% ahead of 1953 for the first three quarters.

He reported that the average deficiency percentage in commercial fertilizers will be above that of last year unless December shows considerable improvement. Concerning advertising he complimented the fertilizer industry as a whole for its cooperation with the Bureau of Chemistry, and apprized his audience of fraud proceedings against two firms.

Uniform regulations were recommended for fertilizer-pesticide mixtures. Dr. Lemmon closed with a request for letters commenting on the bureau publication and offering suggestions designed to increase its usefulness.

### Soil Cons. Soc. 1955 Session

The 1955 convention of the Soil Conservation Society of America will be held at Green Lake, Wis., next Sept. 12-14.

### Offers Sodium Molybdate

Millmaster Chemical Corp., New York, is offering working samples of sodium molybdate for use in soil treatment. First tested for the purpose in Australia and New Zealand (See *Agricultural Chemicals* September, 1954 pps. 42-45) applications of molybdenum greatly reduced and in many cases entirely eliminated the need for liming, upgrading soils formerly too poor to warrant treatment with fertilizers, and opening major new markets for fertilizer manufacturers. In Florida, spray treatments with sodium molybdate have also recently been introduced, providing a cure for "yellow spot" of citrus.

Millmaster Chemical Corp. is acting as eastern sales agent for S. W. Shattuck Chemical Co., Denver.

## South Carolina Discusses Registration

**M**ORE efficient use of fertilizer and better farming resulting in more profitable production were the high points stressed at the annual South Carolina Fertilizer Conference held at Clemson College, Clemson, S. C., November 3-4. The 2-day meeting was attended by more than 300 representatives of the fertilizer industry.

Dr. M. D. Farrar, dean of the School of Agriculture, struck the keynote of the meeting in his opening remarks, stressing the importance of better farming through more efficient use of fertilizer resulting in more profitable production.

A feature of the conference was a tour of the college campus and experiment station pastures. Dr. W. A. King of the Clemson Dairy Department was on hand to conduct the pasture tour which included some of the winter grazing plots on the experiment station dairy farm. The tour included also the new agricultural center which is now under construction.

Featured speakers who appeared on the program during the conference included: Dr. M. D. Farrar, Clemson Dean of Agriculture; J. N. Davis, Epting Distributing Co., Leesville, S. C.; Dr. H. J. Webb, chief chemist, Clemson Fertilizer Department; Dr. E. R. Collins, North Carolina State College; Dr. H. G. Allbritton, South Carolina Experiment Station, Clemson.

Dr. J. Fielding Reed, American Potash Institute, Atlanta; Dr. R. W. Carter, Livestock Sanitary Work, Columbia; Dr. O. B. Garrison, South Carolina Agricultural Experiment Station; N. R. Page, South Carolina Agricultural Experiment Station; J. F. Bullock, USDA agronomist, Pee Dee Experiment Station, Florence, S. C.; J. M. Lewis, extension tobacco specialist, Florence, S. C.; Dr. J. B. Pitner, Agronomy Department, Clemson; Dr. J. H. Cochran, Entomology and Zoology Department, Clemson; J. E. Youngblood, chief, Extension Division Marketing, Columbia, S. C.;

and Henry S. Johnson, director of information, Farm Credit Administration, Columbia, S. C.

Fertilizer manufacturers operating in South Carolina were reminded of the S. C. Fertilizer-Pesticide ruling which was promulgated and issued by the Fertilizer Board Control. The ruling becomes effective not later than July 1, 1955 and states that fertilizer manufacturers incorporating economic poisons in commercial fertilizer be required to attach a colored tag, minimum size 2 x 4 inches, to each package. The following information is required on the colored tag:

1. The statement: Economic poison added.
2. Ingredient statement or guaranteed analysis of the economic poison formulation added.
3. The statement: This commercial fertilizer contains (—) pounds of technical (—) of technical (—) accepted common name (—) per 100 pounds of economic poison.
4. Directions for use.
5. Warning or caution statement.
6. Name and address of fertilizer manufacturer.

## Soil pH Testing Time Reduced

A new and accurate method which reduces electrode standing time in multiple soil pH determinations has been developed by the Department of Soils, Ontario Agricultural College, Guelph, Ontario. Annually the department makes some 25,000 soil pH measurements, thus creating a need for shortening these determinations to the utmost.

Ordinarily from 5 to 15 minutes are required for the pH meter electrodes to stand in the soil solution. The new method, involving the use of a Beckman Model H-2 pH Meter, cuts this time down to 20 seconds or less, and eliminates the need for a fixed soil-water ratio.

A complete description of the method employed by the Ontario Agricultural College may be obtained by writing for Data Sheet 25, Beckman Instruments, Inc., Fullerton 1, California.

## Cyanamid Names Sears

Appointment of Dr. Carl A. Sears as assistant technical director was announced recently by American Cyanamid Co.'s, Agricultural Chemicals Division. Dr. Sears will assist technical directors, M. V. Bailey, in planning and directing the technical work for the Division.

## Wilson and Geo. Meyer Import into Port Hueneme

California farmers of the Port Hueneme area can now take delivery of imported cargoes of nitrogenous fertilizers direct from the ship, as the result of culmination early in December of a long-range program formulated and carried out by Wilson & Geo. Meyer & Co., San Francisco. The 9500-ton motorship "Buffalo" of the Fred Olsen line made the first delivery December 1.

Standard practice would be to discharge at Los Angeles the cargo of Norwegian calcium nitrate and urea fertilizers which the "Buffalo" carries. Farmers in the Santa Barbara-Ventura-Oxnard-Santa Paula area would have to take delivery through Los Angeles. But by routing the "Buffalo" into Port Hueneme, they can take delivery close to their farms, saving \$1 or more per



ton because of lower inland freight charges and shorter hauls.

The Meyer firm has previously routed fertilizer cargo into San Diego, for San Diego County and Imperial Valley farmers; into Stockton, for farmers of the Sacramento, San Joaquin and Delta areas, and into Vancouver, Wash., (instead of Portland, Ore.) to supply southern Washington and western Oregon. The discharge of the "Buffalo" cargo at Port Hueneme carries the program forward another step.

## AGRICULTURAL CHEMICALS



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**Fertilizer Mixtures for Corn Rootworm Control**

**Here's what America's  
Leading Agricultural Insecticide  
Offers You—**

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**FOUR REASONS FOR USING METHYL BROMIDE**

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If your problem is in growing, storage or processing of grain, fruit, meat, dairy products, tobacco, cotton, peanuts or other foods, you will find that Methyl Bromide is the ideal fumigant. An authoritative 16-page brochure on the use and application of Methyl Bromide for various fumigation problems is available on request. Write for Pestmaster\* Fumigation Manual.



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QUALITY PRODUCER OF PESTMASTER\* DDT & METHYL BROMIDE AND OTHER AGRICULTURAL CHEMICALS

### Baughman Appoints Lee



Baughman Manufacturing Company, Jerseyville, Ill., have named Leonard H. Lee to represent the company as sales engineer in their eastern territory. The Baughman line includes fertilizer spreaders and blenders and other bulk conveying and transport equipment. Mr. Lee will cover his large territory, which includes all states east of the Mississippi except Wisconsin and Illinois, flying one of the Baughman Cessna planes.

### HNH. Plant In Geneva

The Chemical Plants Division of Blaw Knox Co., Pittsburgh, announced recently plans for construction of a multi-million dollar anhydrous ammonia plant at the Geneva Works of U.S. Steel Corp. Construction is scheduled to be completed early in 1955. Output capacity when in production in 1956 has been set at 70,000 tons of ammonia.

### New England Hears McVickar

The only way farmers can keep production costs low and make profits in the face of high fixed costs is to use increasing amounts of fertilizer per acre, Malcolm H. McVickar, chief agronomist of The National Fertilizer Association, told delegates to the New England Fertilizer Conference in Burlington, Vermont, November 2-3rd, at the Oakledge Hotel, Lake Champlain.

Dr. McVickar pointed out that while New England fertilizer consumption is decreasing percentage-wise relative to that of the whole country, this does not mean that farmers are using less fertilizer today than they have in the past. The six-state area is merely using less of the total U. S. production. New England farmers applied an average of 118 pounds of fertilizer per acre in

1940; by 1950 they had more than doubled their average application to 245 pounds per acre.

Speaking on the subject, "Fertilizers and Materials—Supply and Demand for 1954-55," Dr. McVickar presented outlook summaries for the three primary plant food elements—nitrogen, phosphate, and potash. Nitrogen available for farm use in the coming year will be about 10 percent more than that available last year and double the amount for 1950.

### Tenn. Corp. Appointments

E. H. Shelton, formerly sales manager of the Atlantic sales office of Tennessee Corp. has just been appointed by the company, general sales manager with offices in New York. L. S. Kaniecki has been advanced to manager, chemical sales, and H. G. Cunningham to assistant manager, chemical sales, Atlanta. R. W. Alexander has been named assistant general manager of the company's Lockland, Ohio plant.

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Sprays  
Dusts  
Fertilizers for 3 jobs  
Triangle Brand Copper Sulphate

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), in dusts (if you prefer them) and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphate:—

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## NEWS *Brevities*

C. E. TITENSOR has joined the staff of the Selco Supply Co., Eaton, Colo., as technical service and sales representative in the Rocky Mountain area.

\* \* \*

BREA CHEMICALS, INC., subsidiary of the Union Oil Company of California announced recently the appointment of John W. Yale Jr. as plant pathologist.

\* \* \*

REASON-HILL Corporation was awarded a judgment for \$305,000 recently, in federal district court following a five-day trial of the government's suit to condemn the company's

insecticide manufacturing plant at Jacksonville, Ark., 15 miles east of North Little Rock, because the 80 acres of land held by the company is needed for construction of a jet bomber base for the Air Force. The judgment held that the company's machinery cannot be considered personal property, but is involved with the buildings and equipment in the government's purchase of the property.

\* \* \*

D. M. WEATHERLY Co., has moved to larger offices at 830 Ponce de Leon Ave., Atlanta, Ga., in order to handle more projects for fertilizer

manufacturers, according to D. M. Weatherly, president. The company is an organization of consultants, designers and builders.

\* \* \*

ROGER H. MATUZAK, consulting engineer technician, has been named office manager of Fertilizer Engineering & Equipment Co., James E. Madigan, president, reported. The company acts as a consultant and builds fertilizer plant equipment.

\* \* \*

O. B. HITCHCOCK is a new addition to the sales force of Chemagro Corp., New York. He is located in San Mateo, Calif., and will represent them on the West coast.

\* \* \*

THE PROPOSED merger of Dewey and Almy Chemical Co. into W. R. Grace & Co., Baltimore, Md. was approved recently by Grace stockholders at a special meeting.

\* \* \*

LARVICIDE PRODUCTS, Inc., New York, advise that Marshall Parker, formerly sales manager for Desert Grain & Milling Co., Westmorland, Calif., has joined the staff of their San Francisco office, of which George Marks is manager.

\* \* \*

Dr. Walter O. Lundberg, professor of agricultural biochemistry at University of Minnesota and executive director of the Hormel Institute, has been elected chairman of American Chemical Society's Division of Agricultural and Food Chemistry for 1955.

\* \* \*

Ohio's State Water Pollution Control Board has advised municipalities against attempting to go into the fertilizer business in connection with the operation of sewage disposal plants.

"Sludge from a sewage treatment plant is not a true fertilizer," the board explains. "It has definite value as a humus material after it has been dried and it might be considered as a fertilizer base, but it needs the addition of soil nutrients to make it into a marketable product."

### AGRICULTURAL CHEMICALS

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The Test Proven  
Insecticide Diluent



Formulators Report  
Excellent Results

- ... **Excellent drift Control Properties**
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- ... **Neutral pH**
- ... **Desirable Suspension Properties**
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## SUMMIT MINING CORPORATION

BASHORE BUILDING

CARLISLE, PENNSYLVANIA



TEXAS GULF SULPHUR Co. has proposed to split its stock on a three-for-one basis. Directors recently declared the regular quarterly dividend of \$1 a share plus a special extra dividend of 75 cents.

\* \* \*

ALBERT E. FORSTER, president of Hercules Powder Co., Wilmington, was recently elected a member of the National Committee on Boys and Girls Club Work, an organization which directs the activities of 4-H Clubs throughout the nation.

\* \* \*

COMMERCIAL SOLVENTS CORP., New York, announced recently that crystalline ammonium nitrate fertilizer is now available in 80 lb. as well as 100 lb. bags.

\* \* \*

AMERICAN POTASH & CHEMICAL CORP., Los Angeles, announced recently that Joseph C. Schumacher has been named director of research. Mr. Schumacher was formerly with Western Electrochemical Company.

\* \* \*

A NEW SULPHURIC ACID PLANT is to be built for Inland Chemicals Canada Limited at Fort Saskatchewan, Alberta. Contract for construction of the new \$1,000,000. plant has been awarded to the Lummus Company, Canada, Ltd., and construction will start immediately.

\* \* \*

AMERICAN AEROVAP, Inc., New York, manufacturers of insecticide vaporizers, announced the election of F. F. Winberg as president and member of the board of directors.

\* \* \*

SWIFT & Co. recently appointed Kenneth L. Olson a research engineer of the Plant Food division's research laboratory at Calumet City, Ind.

\* \* \*

ALLIED RAW MATERIALS & Co., exporters of fertilizers and insecticides, announce the appointment of F. Sheridan as general traffic manager, effective October 18th.

\* \* \*

EVERETT C. HORNE has been transferred from the Indianapolis to the New York Office of Bradley &

Baker. Mr. Horne, now is general sales manager of the Fertilizer Division at the Bradley & Baker head office. Replacing him in Indianapolis is Edwin T. Baker, who will work out of the Bradley & Baker office in the Board of Trade Building.

\* \* \*

New sales representative in the Northwest territory of Hammond Bag & Paper Co., Wellsburg, W. Va., is M. C. Yerigan, M. E. Greiner, vice president and general manager, announced last month.

HOWARD J. MILLER has been transferred to the Kapco Division of Summers Fertilizer Co. at McKeesport, Pa., where he will be assistant to P. P. Rosette, divisional manager. Mr. Miller has been associated with Summers and its affiliated companies for the past eight years.

\* \* \*

THE RAYMOND BAG Co., Middletown, O. recently appointed Matthew F. Keane to its sales staff. He will represent Raymond in Cleveland, Ohio.

# CHEMICALS

## FOR AGRICULTURE

✓ **Check High Analysis Value**

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**MANGANO**

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✓ **53% Copper as metallic**

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**W. R. E. ANDREWS SALES, INC.**

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Since 1926

*Associated Chemical Distributors*

THE TENNESSEE CORP. will shortly split its stock on a two-for-one basis. The split will increase the outstanding common to 1,770,128 shares.

\* \* \*

MONOMETHYLANILINE has been added to the positive list of commodities which may be exported from the United States only under validated licenses, according to an announcement by the Bureau of Foreign Commerce.

\* \* \*

E. A. BUSH, Rhodia Inc., has been elected committee chairman of

the SAACI nominating committee for 1955.

\* \* \*

SPENCER CHEMICAL CO., Kansas City, Mo., announced the advancement of Dr. A. J. Deutschman, Jr., from assistant director of research and development to director of chemical research. Dr. Deutschman joined Spencer in 1947.

\* \* \*

A MERGER of the Naco Fertilizer Co. of Findlay, a subsidiary of W. R. Grace and Co., with Davison

Chemical Co. also a division of W. R. Grace and Co. was announced recently.

\* \* \*

PENNSYLVANIA SALT MANUFACTURING CO., Philadelphia announced that W. A. LaLande, Jr. who is vice president in research and development was named associate trustee of the University of Pennsylvania.

\* \* \*

SUPERIOR FERTILIZER & CHEMICAL CO., Tampa, Fla., has recently purchased the assets of Growers Fertilizer Co., Fort Pierce, Fla. G. D. Sloan is general manager of Superior Fertilizer.

\* \* \*

JAMES F. SOLLEY, JR. has been named product manager, irrigation sales, of the Eastern Fertilizer Division of Olin-Mathieson Chemical Corp., Baltimore.

\* \* \*

HANDY PRODUCTS CO., Louisville, Ky., has been granted a state charter to deal in insecticides. Incorporators include Robert C. Whitney, Sr. and Robert C. Whitney, Jr.

\* \* \*

DOW CHEMICAL CO., Midland, Mich., has just acquired all outstanding stock of Versenes, Inc., Framingham, Mass. Versenes, Inc., which formerly operated as Bersworth Chemical Co., manufactures chelating agents, one of the uses of which is in the agricultural chemical field, particularly in the citrus industry.

\* \* \*

J. ALBERT WOODS, president Commercial Solvents Corp., New York, will serve as chairman of the New York Chapter of the Commerce and Industry Committee in the 1955 campaign to be conducted by the Red Cross next March to secure members and funds.

\* \* \*

LINCOLN SERVICE & SUPPLY, Inc. have announced plans to expand their Grand Island, Nebraska plant. Included in the expansion program are complete new manufacturing facilities to produce granulated mixed fertilizers. The granulating process being installed at Grand Island was developed by the D. M. Weatherly Co. Atlanta, Ga.

# TYPE 41 CLAY

In making organic concentrates using benzene hexachloride, chlordane, toxaphene, and other similar materials, it is important to have the concentrates free flowing.

TYPE 41 Clay can be combined with more costly diluents, such as Fuller's earth, and the result will be a free-flowing concentrate, at a lower cost to the producer.

TYPE 41 Clay has the following advantages:

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**For farm storage...**



**For bulk storage....**



Welded low-pressure tank for bulk storage.  
In 12,000 and 22,000-gallon capacities.



Bolted 22,000-gallon non-pressure tank for bulk storage.

Skid tanks in 500, 830 and 1000-gal. cap. Others from 100 to 1000 gallons.

## **Profit with BUTLER aluminum tanks for liquid nitrogen solutions**

Cash in on the amazing upsurge in use of liquid nitrogen fertilizers. Butler now offers you two new types of special alloy non-corrosive aluminum bulk storage tanks for liquid nitrogen solutions.

**One is a bolted** vertical 22,000-gallon tank for non-pressure solutions. The welded tank—in 12,000 and 22,000-gallon capacities—is a horizontal bulk storage tank for low-pressure solutions, available to code specifications.

**Smaller size** horizontal aluminum tanks in 100, 270, 500, 830 and 1000-gallon capacities are also available. The 500, 830 and 1000-gallon tanks can be equipped with skids for on-farm storage or transporting solutions from bulk station to farm.



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Please send me full information on Butler aluminum Welded bulk tanks ☐  
Bolted bulk tanks ☐ Small horizontal tanks ☐ Skid tanks ☐

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Firm

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City  Zone  State

## Suppliers' BULLETINS

### Davison M-S Catalyst

Davison Chemical Co., Baltimore, recently issued a four-page bulletin describing its M-S catalyst for use in the petroleum industry. The product contains silica and alumina amounting to 99.8%.

### New Ammonia Gauges

A new line of ammonia gauges, designed specifically for the agricultural ammonia industry, has been developed by the Marsh Instrument Co., of Skokie, Illinois. These gauges

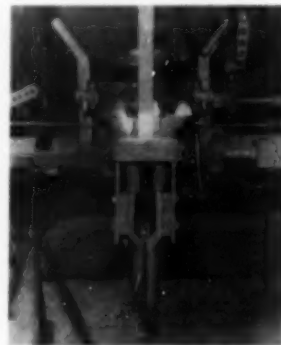
are manufactured throughout of corrosion resistant materials and are suited for use on applicators, storage and processing equipment.

### Information Directory

The USDA has recently issued a directory entitled "How to Get Information from the U. S. Department of Agriculture." The four-page folder lists sources of information of all agencies of the department and gives a brief description of the functions of each agency.

### New Fertilizer-Planter Unit

Working in cooperation with soil and fertilizer experts at Michigan State College, Farmcraft Mfg. Co., Fort Wayne, Indiana, is producing a deep placement fertilizing unit called the Hi-Yield, two-level fertilizer applicator and planter. The new unit, places two bands of fertilizer in the ground; one band is placed 8 inches below the surface and the other, 4 inches down. Seeds

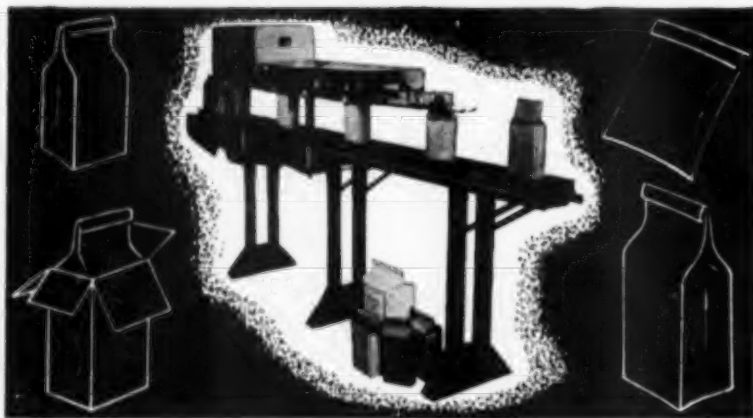


are placed 2 inches to one side of the shallow band and 2 inches below the ground surface.

Although corn is the principal crop worked with, indications are that the unit is suited for planting most other row crops, particularly cotton, sugar beets and vegetable crops such as tomatoes. The unit eliminates the need for side dressing, because of the two-level, two-analysis feature. Rolling coulters are employed as soil openers for fertilizer application. A saber descends on each side of the coulter, one down to the 8-inch level, the other to the 4-inch level.

Planting and fertilizing speeds up to 5 miles per hour are possible with no sacrifice of seed or fertilizer placement accuracy. Large fertilizer and seed hoppers need refilling after a round trip in a 100-rod field, even after heavy application. The seed coulters, which feature a disk type opener, follow the fertilizer coulters and make their own openings, placing the seeds 2 inches to one side of, and two inches above the shallow fertilizer band. Seed and fertilizer are placed separately. Fertilizer hoppers, which hold a total of 500 pounds, and seed hoppers are built

## FRY BAG CLOSING MACHINE



### Makes Sift-Proof Seals in Heavy Weight Paper Bags

Fry Model CSG automatically makes a double folded sift-proof heat seal in the top of any heavy weight paper bag. The first fold is securely heat sealed; the second is glued for extra safety.

Bags handled include polyethylene and ployfilm lined, polyethylene coated and those with thermoplastic top sealing

bands. Simple adjustments for bags of various heights. This model also handles bags which are not heatsealable by gluing the folds.

Machine above is perfect for granular or fine products such as insecticides, chemicals, powdered paints, fertilizers, dog foods, etc.

Other models available . . . when writing, please submit a sample of your bag and your product.

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close to the ground to increase placement accuracy and to reduce work in filling.

### New Barber-Greene Vibrator

A light-weight vibrating feeder was announced recently by Barber-Greene, Aurora, Ill. The unit known



as the "Redi-Flow" has a capacity in excess of 300 tons per hour. It is made in 20 and 26 inch widths for feeding 24 and 30 inch belts, respectively. It is reported that lumps up to 12 inches in size can be handled when mixed with fines, or to 8 inch maximum when lumps are of uniform size. Featured is a self-cleaning element and a leak-proof feeder pan which eliminates carryback sometimes encountered with apron or belt type feeders.

### New Acrylonitrile Compounds

Monsanto Chemical Company's Organic Chemicals Division has added four new acrylonitrile derivatives to its group of nitrogen petrochemicals. The compounds are beta, beta'-thiodipropionitrile, beta, beta'-oxydipropionitrile, beta-chloropropionitrile and beta-chloropropionic acid. The new products are available in experimental quantities.

Technical data sheets prepared by the company suggest that the products be evaluated as intermediates for a variety of organic chemicals, including use as herbicides. Beta-chloropropionitrile and beta-chloropropionic acid feature an activated chlorine atom which is easily replaced. It is reported that this facilitates the introduction of a cyanoethyl or a carboxyethyl group into organic compounds.

### Hough Attachment Folder

The Frank G. Hough Co., Libertyville, Ill., has recently issued a new bulletin entitled "Useful Attachments for Payloader Tractor Shovels." The bulletin describes sixteen attachments, which are available to adapt tractor-shovels to many tasks in addition to the bulk materials handling and earth-moving for which they are generally used.

### CSC Nitrogen Bulletin

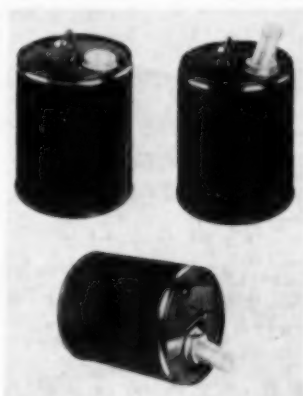
Commercial Solvents Corp., New York has recently issued bulletin TDS No. 1 on nitrogen solutions. The bulletin lists the physical and chemical properties of various concentrations of nitrogen solutions and gives crystallization temperatures and data on shipping and storage containers. It also lists data on safety precautions and first aid measures.

### Nitrogen Storage Tanks

Liquid nitrogen fertilizer can readily be handled in aluminum tanks, which resist corrosion and are said to give the farmer safe, efficient methods of storage and application. Aluminum tanks made by the Aluminum Co. of America, Pittsburgh, Pa., are available for 10,000 to 20,000 gallon storage; 50 to 200 gallon sizes for application; and as 500-1000 gallon sizes for distribution to smaller application tanks.

### New Vulcan 1-gal. Drum

Vulcan Stamping & Mfg. Co., Bellwood, Ill., is now offering from



stock a new 1-gallon tight-head drum to meet the demand for small, easy-to-handle shipping and dispensing

containers. The containers are available with either a regular interior coating or a chemically resistant hi-bake lining for dangerous or hard-to-hold products. Pouring spouts are also offered, in either plastic or metal.

### Am Potash "New Look"



American Potash & Chemical Corp.'s program to redesign containers for its products has been extended to the company's Agricultural Chemicals Division.

First announcement that the redesigning program was under way was made earlier this year when the 21 products manufactured at the company's main plant at Trona, Calif., were given a "new look." These included the company's four major heavy chemicals, potash, salt cake, soda ash and borax; Tronabor, Pyrobor, Borotherm, boric acid, bromine, lithium carbonate, sulfate of potash, muriate of potash and others. (*Agricultural Chemicals*, p. 127, June, 1954).

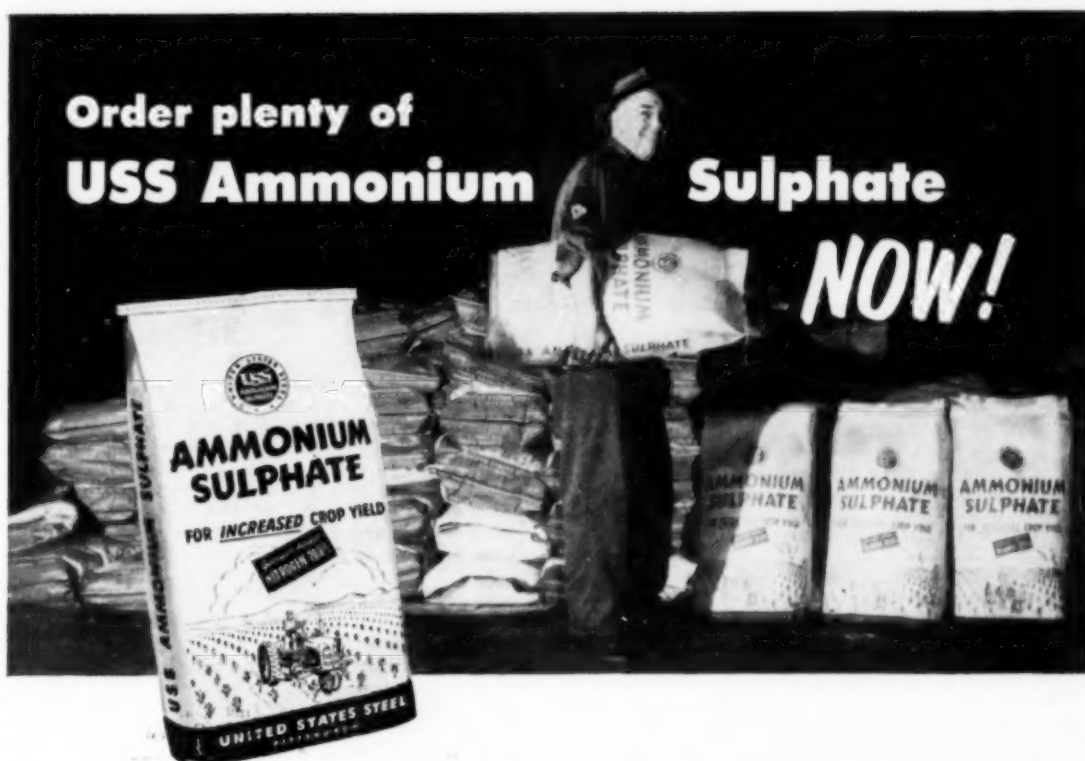
Extension of the redesign plan to various divisions of the company, includes the Agricultural Chemicals (Easton Chemicals) Division which formulates insecticides such as Estonate, aldrin, dieldrin, endrin and estonox; organic phosphates including Alkron, Tetron and Malaphos; miticides such as Estonmite and Aratron; fumigants including methyl bromide, M-B-C, Bromofume, and E-D-Bee; and weedkillers and defoliants such as Tumble-Weed-25 and Tumbleaf.

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**This year there will be heavier-than-usual demand  
for NITROGEN for early spring application**

**Here's why:** Many states are actively promoting pasture-building programs this year. The basic prescription for such programs will follow the present trend to high-nitrogen fertilizing. Agricultural college demonstrations—and actual experience—are showing more and more farmers how extra nitrogen brings high profit return from pastures, grass crops and small grains. These developments should definitely result in record demand for nitrogen this year. Will you be ready?

An important feature of the widespread promotion will be *earlier application*—for earlier grass growth and a longer grazing season. That means that all your dealers must be well stocked as early as possible.

But don't forget that late winter or early spring high-nitrogen top dressing or broadcast and plow down calls for nitrogen in the non-leaching Ammonia form. So to give your customers top nitrogen value, sell them USS Ammonium Sulphate both in mixed fertilizers and for direct application . . . it will not leach out of the soil even during heavy spring rains.

USS Ammonium Sulphate is an easy mixer. It is carefully kiln-dried so that it stays free-flowing. It's available in moistureproof 100-pound bags or in bulk quantities for mixing. Order your supply of USS Ammonium Sulphate *now* so you can be sure of quickest delivery. Don't be caught with your stocks down when the big orders start coming.

**USS AMMONIUM SULPHATE**



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## APPLICATION EQUIPMENT

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crop from damage or increasing the yield. More than one billion lbs. of aerial dust and spray were used last year in the United States.

The tremendous growth of the custom spraying industry since the end of World War II, Mr. Ward ascribed to the fact that the airplane is doing its job more efficiently and more economically than other types of equipment can. One primary consideration is that the airplane does the job faster than ground equipment. There is always, he pointed out, one best time to spray for insect pests or to fertilize. The airplane can do the job so rapidly it allows the farmer to wait until that one best time to put his application on—and to get the most good out of it. The farmer gains more flexibility in his operations. He may proceed without committing himself too far in advance and frequently can wait until all the facts of weather, growth and conditions are known before making his decision as to what and when to spray.

Second, in many cases, the airplane does the job cheaper. This is especially true in low dosage situations such as in weed killing in the Pacific Northwest. Mr. Ward referred to the "economic threshold" for each particular airplane beyond which that particular plane is not economical or feasible to use. This threshold is set by the load involved. In fertilizing of grain, for example, at rates of application below 100 lbs. to the acre, the airplane is competitive with ground equipment. As the rate gets above 100 lbs., however, the farmer generally finds it cheaper to use his ground rigs if weather and other conditions permit. As newer and better crop dusting planes become available, this threshold can be pushed higher—perhaps even to 200 lbs. to the acre by next season, Mr. Ward observed. Some six new agricultural aircraft designed specifically for this type work are in various stages of development right at the moment and Mr. Ward commented that his own company is nearly ready

to fly the first commercial model of a new "air tractor" which will carry more than a ton of dust or spray.

A third advantage of aircraft for spraying operations is that they do not cause mechanical damage to the crop.

## FERTILIZER PRODUCTION

(From Page 29)

work force. Costs could be reduced all along the line, and fertilizer manufacturers could make a further contribution to the great American pattern of extending use of wealth-producing tools by steadily reducing cost to the users.

## N. Y. S. ITHACA MEET.

(From Page 71)

Horticultural Research Branch, Beltsville, Maryland, apprised those attending the conference of the extent of research in this field, and summarized its present status and outlook.

W. B. Rankin, assistant to the commissioner, Food and Drug Administration, Department of Education, Health and Welfare, Washington, D. C., spoke on the tolerances proposed recently by the FDA and outlined the procedure his organization proposes to follow under the recently enacted Miller Bill.

Dr. M. B. Hoffman of the Department of Pomology at Cornell reviewed research of the past season dealing with chemical thinning and drop control on apples and summarized the present status of the extension recommendations in these fields for the coming year.

A total of 482 registered during the three-day sessions. The meetings are designed to acquaint members of the pesticide industry and the pesticide applying equipment manufacturers with the highlights of experimental work in New York State and the extension recommendations for the coming year. They are open to representatives of all industrial concerns and others interested in the program.

## EAST. BRANCH ESA

(From Page 52)

using isolin and malathion, according to John C. Schread, Connecticut Agricultural Experiment Station.

The important New Jersey ornamental, holly, was protected from insects and spider mites by use of DDT and phosphate sprays in the dormant oil form, C. C. Hamilton, of Rutgers University, reported.

Boring insects in logs, an expensive pest to loggers, were routed with BHC and DDT sprays, William B. Becker, Massachusetts Agricultural Experiment Station stated.

Other topics included white pine weevil control by aircraft spraying, D. P. Connola, N. Y. State Science Service; thrip control in greenhouses and on ornamentals, Floyd F. Smith, USDA, Beltsville, Md.; and resistant mite control, by John A. Naegele, Cornell University.

Daniel Clower, who was scheduled to speak on elm leaf beetle control, was unable to attend, and the paper was not presented.

Next year's meeting will be held in Baltimore.

## PESTICIDE TOLERANCE

(From Page 53)

mean that the chemical cannot be used at all on food crops?

MR. NOONE: As I understand the meaning of zero tolerance it means that no residue can remain on that crop when it is harvested, within the legal technicalities of Interstate Commerce. I can see many situations where certain chemicals rapidly dissipating, T.E.P.P. for example, could be used on a crop four days before harvest and it will be completely dissipated. So if a zero tolerance were placed on T.E.P.P. at harvest, it doesn't mean that it couldn't be used four days before.

Question: When you apply for an experimental license, you have to put on your label "Not to be used for food use" or something to that effect. However I understand that a temporary tolerance might be allowed in the future for experimental products. Is that correct? How much data will be needed?

MR. GOODRICH: You need enough scientific data to justify us in the taking of the short risk. . . . I understand that now it is an inflexible rule that the food crop be destroyed. This new law leaves a possibility that some food crops can be used. All I can say is that you will need enough scientific evidence to justify us in taking that risk for that short period of time.

AGRICULTURAL CHEMICALS

Question: How soon should we make application for these tolerances?

MR. CONNER: It would depend a great deal on what particular product it is with which you are concerned. If it's one concerning which you put enough evidence in the record under F.D.C. 57 that you anticipate the proposed order (Now issued. Ed. Note) will take care of you, I think that is going to automatically take care of the residues of that substance. Insofar as F.D.C. 57 is concerned, after tolerances are issued that would automatically bring into play the adulteration provisions of the Miller Bill. Insofar as those specific tolerances are concerned you would still have until July 22, 1955, and that could be 1956, to get your tolerances in line and effective for any other uses of that product. In other words, until that date if no tolerance has been issued then any food bearing a residue of that particular chemical will not be subject to adulteration until that effective date. You are going to have to have a tolerance one way or another by that date, so I would figure backwards from this deadline of July 22, 1956 and figure how long it would take you to get your tolerance under the time schedule that is specified and make certain that you start your application in time enough to have your tolerance through by that time, unless you anticipate that it is going to be taken care of under F.D.C. 57. . . . It will be a good idea to get the material lined up. I think the companies know what they are going to have to have so that when regulations do come out (Just issued, Ed. Note) the material will be pretty well in line, particularly where you feel there's going to be some dispute along the way in getting the tolerance lined up.

MR. NOONE: A company could proceed now to collect and put in proper shape the information as specified in the Bill itself. Maybe when the final regulations are issued you may have to add a little more or reword it in a slightly different form but it's not going to change the substance of the data and material that must be collected.

Question: When a tolerance on any given product is once established, in case foods or crops are seized because they have too much residue, what is the manufacturer's responsibility?

MR. GOODRICH: The only provision in the Bill on that has to do with the giving of false guarantee in Section 303C of the Federal Food, Drug & Cosmetic Act. The new law provides that the provisions of Section 303 (c) with respect to furnishing of guarantee shall be applicable to raw agricultural commodities. This new provision was urged by the canners so they could obtain a guarantee from the grower that the product supplied to them is within the tolerance. The responsibility of the manufacturer to the grower is covered by private litigation and is not covered by the statute.

Question: Where the proceedings are going forth on behalf of one company on a certain product, can another company that has a similar product rely on the information they have furnished for

their product? Will that tolerance cover the product of another company?

MR. COYNE: The answer is "yes." We'll maintain a working file as to tolerances promulgated by Food & Drug and if any subsequent application for the pesticide chemical comes in, we'll be guided by the tolerances proposed and previously certified as useful. The same situation holds true, of course, with respect to our certifications of usefulness.

## AGRONOMY CONFERENCE

(From Page 49)

Reporting on "The Effect of Surfactants Upon Plant Growth" E. C. Spurrier and J. A. Jacobs of the University of Illinois observed that in first harvest results of an experiment using Kentucky blue grass as a test crop, there were no yield differences of dry matter due to the addition of surfactant to the fertilizers. Greenhouse studies with potted rye grass receiving rates of nitrogen up to 270 lbs. per acre and surfactants up to 200 lbs. per acre showed highly significant yield responses to nitrogen, but no apparent response to surfactant.

D. G. Aldrich and J. R. Buchanan of University of California reported on experiments to determine the possibilities of use of injected liquid nitrogen dioxide as a fertilizer. They concluded that this material is readily absorbed by the soil with losses less than 1%. In acid, neutral, or unbuffered alkaline soils, injected liquid nitrogen dioxide produced a sufficiently acid soil reaction to insure rapid and complete chemical oxidation to nitric acid. In highly buffered alkaline-calcareous soil, the injected liquid nitrogen dioxide produced little change in soil reaction and was only partially oxidized to nitric acid.

J. W. Fitts, C. D. Welch and W. L. Nelson of the North Carolina Department of Agriculture reported that soil test summaries have been helpful in preparing general fertilizer recommendations on an area basis. Results for phosphorus and potassium when summarized together give a good indication of the ratios of these nutrients most needed in fertilizers. The summaries, they noted, have been helpful to commercial companies in selecting fertilizer grades to be manufactured.

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**More Efficient Fertilizer Use**  
SEVERAL papers covered the subject of education for more efficient use of fertilizers. In this group, H. L. Dunton of Virginia Polytechnic Institute emphasized that efficient use of fertilizer is sound economics. In recent months, he reported, many farmers have indicated that in their desire to reduce production costs, they are considering reducing the amount of fertilizer being used. A summary of fertility experiments conducted with feed crops in Virginia recently, however, shows clearly that the farmer cannot afford to cut down on use of fertilizer, but rather would improve his crop production efficiency by increasing the amount of fertilizer used. Mr. Dunton documented his case with figures indicating that if the average Virginia farmer applied the recommended rate of fertilizer on corn, instead of the actual current average application, as well as using other recommended practices, his average yield per acre should increase approximately 24 bushels per acre and return almost \$25 per acre above the cost of the additional fertilizer. In the case of alfalfa, the yield would increase by 1¼ tons per acre, with a return of almost \$20 additional per acre over the added fertilizer cost.

G. V. Taylor of Spencer Chemical Company talked on "What Fertilizer Dealers Can Do in Promoting Fertilizer Use." While fertilizer use has increased substantially over recent

years, it is still not being used in quantities as large as should be employed. Among the reasons for the failure to use fertilizer as generously as it should be used, he observed that fertilizer is a sideline for most dealers, that profit per bag seems small to the average dealer and that fertilizer demands more know-how and study than other items which the dealer handles. "Farmers will never use a fraction of the fertilizer they can profitably apply" he concluded, "unless intelligent fertilizer dealers show them the way."

#### Herbicides—Avoid "Too Little Too Late"

INCLUDED in the group of papers on herbicides was a report by Lambert C. Erickson, University of Idaho, on the evaluation of eleven selected herbicides. Quantity of herbicide applied and time of application were found to be the essential factors to consider, and the two common errors in use of selective herbicides tend to be application of an insufficient quantity of herbicide or too late application.

G. C. Klingman and J. C. Davis of North Carolina State College reported on experiments with application of ammonium nitrate solution, 2-4-D and "Karmex M" for weed control in corn. A water solution of ammonium nitrate plus a wetting agent with or without 2-4-D proved to be a very effective post-emergence treatment when applied as a spray

directed to the base of the corn plant and to weeds in the middle. Broad leaved weeds were controlled more effectively when 2-4-D was included in the spray. Ammonium nitrate applied as a directed spray was fully as effective as a fertilizing material as was the solid form. "Karmex M" gave weed control one to two times as long as 2-4-D.

Paul W. Santelmann and C. J. Willard, Ohio Agricultural Experiment Station, reported on their experimental work with "Dalapon" for control of quack grass. Results with "Dalapon" were not encouraging. Even 40 lbs. per acre failed to eradicate the grass where the plots were not plowed. In the fall treatments, which like the spring treatments were conducted under much drier conditions than normal, treatment without plowing failed at 20 lbs. per acre to give a complete kill. They concluded that a combination of chemical control plus cultural practices will be much more effective than use of "Dalapon" alone.★

#### IRON CHELATES

(From Page 55)

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## Agricultural Chemicals Moves



**W**E moved to our new building in Caldwell, N. J., early this month.

Please correct your records to indicate our present address,—  
Box 31, Caldwell, N. J.

Phone calls will reach us by direct wire to New York. We don't have our new phone number yet, but for the time being you can still reach us through the old number—ALgonquin 4-4033.

And you needn't feel that just because we took a short jump across the river to Jersey that we are now a jillion miles away. It's only a short run west of the Lincoln Tunnel.

Find out for yourself how short by coming out to see our new quarters some day soon. We'll be happy to shown them to you.

## AGRICULTURAL CHEMICALS

BOX 31

CALDWELL, N. J.

and in Puerto Rico, Hawaii and other areas.

Many thousands of acres of citrus in Florida have been treated successfully in the past few years with outstanding results. In these citrus groves, the use of the iron chelates is already well established. More and more growers are beginning to use these materials as they see how they increase income and salability of fruit.

The use of chelating compounds on other trees and plants is also increasing slowly but surely. Progressive growers in many fields in different parts of the United States are applying this new scientific treatment to their advantage. Conservative growers seeing these results are gradually turning to its use. ★★

## SELL ENTOMOLOGY

(From Page 31)

citizen of our land is made fully aware of his insect problems. We must, through the proper presentation of detailed data on the nature and extent of losses caused by insects, show farmers, warehousemen, and others just how much of their potential profits are being drained away by insects, and how much they could save by adopting proper insect control practices.

Entomologists can and must render farmers and others another valuable service by making available to them all during the growing season the results of insect surveys and timely information as to the abundance and probable time of appearance of damaging populations of insects. Many farmers who know what chemicals to use and how to apply them need advice as to the proper timing of control measures for maximum benefits, and many more farmers also need counsel and advice as to when it is and is not profitable to undertake control measures. In the past few years the state and federal cooperative Insect Survey and Reporting Services have made tremendous strides in this direction, but the service now rendered should be doubled, trebled, or quadrupled as

quickly as possible. There is also need for much additional educational work on the proper use of currently recommended insect control measures. Too much time and materials are now wasted through the use of incorrect dosages, the incorrect choice of materials, incorrect application methods and the poor timing of treatments.

No educational program can prosper or indeed succeed while seriously hampered by suspicion, mistrust, and fear; therefore, the agricultural chemicals industry can do much to strengthen and safeguard an educational program by maintaining an irreproachable record of thoroughness and integrity in the testing of new materials before they are offered to the public. By maintaining current high standards for research prior to the introduction of new materials, industry can create an atmosphere of confidence. Once the prospective user of insecticides is assured of his own safety, and the ultimate consumer of the products he produces is equally assured that such products are in no way injurious to his health or well being, then

fear and suspicion will vanish. When these elements of distrust have been eliminated, we may rightfully expect our proposed educational program to prosper.★★

## SPRAYERS & DUSTERS

(From Page 41)

present no particular health hazards to the applicator, but Elgetol, which might also be used as a defoliant, is very toxic. It approaches the more toxic organic phosphate compounds in toxicity. The chlorate-type weed killers, unless fortified with boron compounds, may present a serious fire hazard to the applicator.

A list of insecticides and their relative toxicity was shown by Gordon Batchelor, U. S. Public Health Service Entomologist at Wenatchee. He mentioned some of the symptoms associated with TEPP poisoning—headache, nausea, and difficulty in breathing which is encountered in severe cases—with death possibly occurring due to lack of oxygen. He urged applicators to watch victims of accidental poisoning carefully, and

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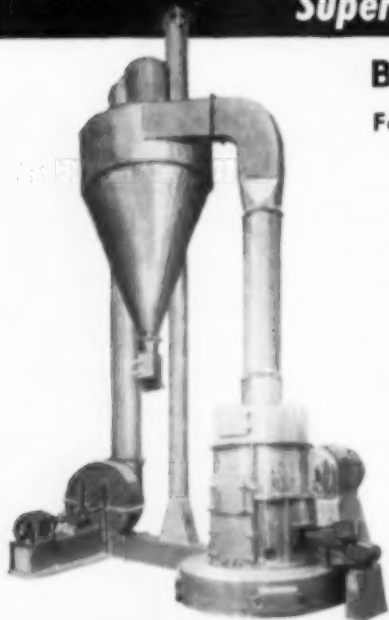
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to give artificial respiration, immediately if the individual turns blue or stops breathing.

Field checks on the exposure of plane crews to TEPP dust gave some rather interesting information. In one instance loaders were observed to have the heaviest exposure, followed by the pilots, and finally the flagmen. Loaders were found to be using their hands and arms to push the dust forward into the hopper, and thus came into more direct contact with the chemical than did pilots or flagmen. Use of larger hopper openings or large sliding lids might eliminate some of this loader contamination.

Mr. Batchelor pointed out that cases of poisoning, presumably from Systox, occurred in California this year, resulting in considerable lost time. Some of this might have been prevented by clearly instructing and warning all workmen regarding the materials used. "Warn loaders particularly to destroy containers," concluded Mr. Batchelor.

Representatives of plane manufacturers present at the conference included Bell, Transland, Central-Lamson, National Aircraft and Piper. Stanley Strew, president, Western Agricultural Chemicals Association, told the operators they could count on the full assistance of the agricultural chemical industry in their legal and technical problems. "The agricultural chemical industry's mission is to produce materials which will give adequate control. If the agricultural aviation boys don't do a good job of application, the best material in the world hasn't a chance," he concluded.

The next Sprayer-Duster meeting will be held in Wenatchee, October 18, 19, 1955.

## CANADIAN MEETING

(From Page 45)

Unrau of the University of Alberta, he reported, indicates that the genetic makeup of cereal crops may be affected by the use of 2,4-D. If this is confirmed by further research, seed growers, he feared, would have to stop using these materials.

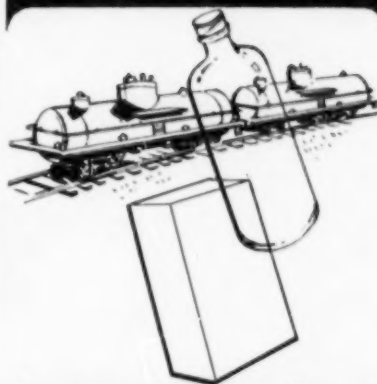
Turning to pesticides, he observed that again seed growers would be very happy if the pesticide industry can develop reasonably priced and relatively efficient controls for a number of diseases and insect pests for which no satisfactory control measures as yet exist. Among this group he included dwarf bunt of wheat, ergot of many of the cereal crops and loose smut of wheat and barley.

Don Kimball, Wyndham Orchards, Simcoe, Ont., covered orchard use of agricultural chemicals, summarizing his view of the importance of these orchard crop aids with the comment, "without the agricultural chemical industry, fruit growing would cease to exist, commercially, in a very short time." However, he added that, "The grower is, understandably, perturbed by the increasing number of spray or dust applications needed to grow marketable crops, both because of the expense involved and the possible injury to plants or their consumers. He is confused by too many trade names for the same chemical; a situation which I see you have taken steps to correct. He is placed in an impossible situation through the reporting or recommendations which place various, similar purpose chemicals in a table of merit in which the positions of the various materials are hardly justified, practically, by a careful, critical analysis of the experimental results. Too often statistically, certainly practically, unimportant differences are used as yardsticks of value and sometimes equipment, personal factors or timing of sprays are of vastly more importance than any difference in the effectiveness of the chemicals used."

B. H. Goodwin Wilson, agricultural supervisor, Canadian Cannery Limited, Aylmer Products, Hamilton, Ont., reviewed the status of chemicals in the Canadian agricultural economy in his paper "Agricultural Chemicals and Vegetable Growing."

Citing the salvage of the pea crop by the use of dinitro herbicides in the north-western Washington area in 1948, Mr. Wilson gave a clear picture of the importance of agricul-

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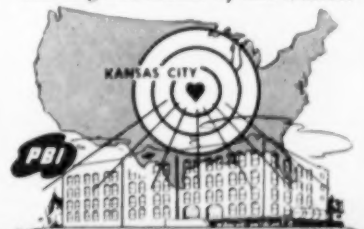
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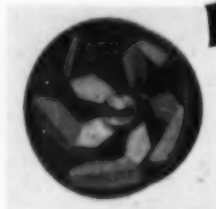
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**AGRICULTURAL CHEMICALS**

tural chemicals. He reported that in Nova Scotia, all his company's acreage is treated with pre-emergence or post-emergence sprays and that without such control economic operation would not be possible. Aphids, a perennial problem to pea growers, have been effectively controlled by the use of TEPP and malathion; however, Mr. Wilson, somewhat optimistically expressed the growers' hope that even better insecticide may be developed. He envisions a product with the insecticidal efficiency of the present TEPP or malathion, but which will also have a long residual effect and still present no problem of residual toxicity on the marketed crop.

According to Mr. Wilson, tomatoes offer more problems to the grower than most other vegetables. As yet, adequate controls have not been developed against such pests as army worm, corn ear worm, and the newest pest, russet mite. TEPP deforms the tomatoes, parathion and malathion present residue problems, D.D.T. will distort tomatoes and the only material recommended is sulfur. Even sulfur can be picked up in the processed product, giving it an odd flavor and smell, and causing discoloration of metal.

Despite the fact that many agricultural chemicals may do a good job, they are not necessarily economical to use, said Mr. Wilson, giving the example of the Alanap trials on cucumbers in 1953. The material was found excellent for controlling weeds, however due to the type of acreage and the type family working this particular farm, use of Alanap was found to be too expensive.

H. C. Greenlaw, Millville, N. B. concluded the symposium with a discussion of use of agricultural chemicals on potatoes. Introduction of DDT has given a great boost to the potato growing industry, he noted; in fact its use has done such a good job in the protection of the plants that, by eliminating insect pests so completely, it has made use of top killer necessary. He emphasized the importance of early, and frequent use of sprays, and of using DDT as fresh as possible, since its strength seems to deteriorate

with age. He suggested at least 7 or 8 sprayings, starting when plants are not more than four to six inches high, and continuing at weekly intervals until the plants practically have their growth.

He noted that in addition to potato bugs and flea beetles, aphids do great damage to the potato crop unless controlled. Since they come late in the season, when spraying schedules have normally been completed, they are hard to control. Inclusion of malathion in late season sprays was suggested to achieve practical elimination of aphids.

#### Developing The Market

THE final convention session, October 30th, featured a program built around the theme, "Bringing the Message to the Farmer, with representatives of the press, radio, television, the government, Canadian 4-H Clubs and the agricultural chemical industry dealing with different phases of the problems involved in familiarizing Canadian farmers with

the products of the industry and their uses, and persuading them to use more of them as efficient tools in expanding Canadian agricultural output.

Featured in this program were a series of charts and posters emphasizing the potential expansion possible in the Canadian market if this educational and marketing job is done right. The Dominion Bureau of Statistics reports the volume of business done by the pesticide industry of Canada at almost eighteen million dollars in 1953. This compares with just about half this sum only six years ago. The totals follow:

1953	\$17,686,000
1952	16,002,000
1951	15,801,000
1950	15,427,000
1949	14,202,000
1948	11,990,000
1947	9,749,000
1937	5,540,000

Figures were presented showing that in 1953 the industry sold 130,000 gallons of livestock sprays. This was estimated to be only about nine percent of the potential market.★★

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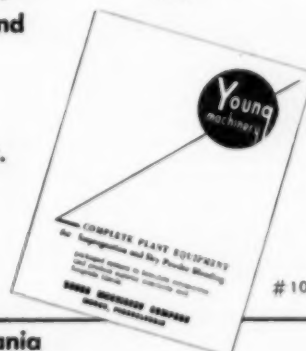


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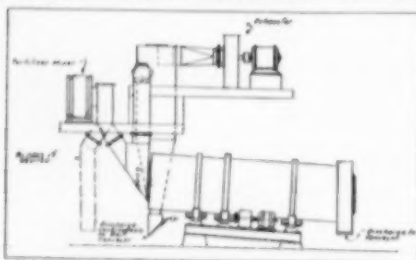
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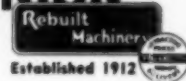
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**AGRONOMIST:** Will graduate June, 1955, B. S., Soil Science. Background studies in Chemistry and Physics. Interested in research. Any location acceptable. Address Box 917, c/o Agricultural Chemicals.

**ENTOMOLOGIST:** Ph. D., aged 43, desires position in sales and market development program. Extensive industrial experience in production, development, and sales. Thoroughly conversant with office management, inventory, billings, collections, etc., and direction of personnel; bondable. Competent to handle an entire sales branch or any portion thereof; good university, government, and army background (not in reserve). Widely acquainted with industrial and states and federal officials in the eleven western states. Good appearance, health, and personality. Excellent recommendations and references upon

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**Nematology Grant To API**

A \$45,000 grant for research and training in nematology has just been made to Alabama Polytechnic Institute by the Rockefeller Foundation. The fund will be made available during a three-year period beginning Jan. 1, 1955 for the support of research on nematodes and training of graduate students in nematology.

**Positions Open**

**LOOKING FOR A CAREER?** National Manufacturer of Pesticides has several sales openings in Northeast (Maine to Virginia) for Entomologists, Pathologists, or with strong Agricultural background. Sales experience preferred, to age 35. Give all details and photograph. Address Box 918, c/o Agricultural Chemicals.

A program of research on nematodes has been under way at API for several years, with Dr. E. J. Cairns, formerly with the USDA Section of Nematology at Beltsville, Md. heading the project. The program is three-fold: (1) basic research on how nematodes cause plant disorders, (2) undergraduate and graduate training in nematology, and (3) servicing the region in identification of nematodes and development of techniques for research on control measures. The new \$45,000 grant from the Rockefeller Foundation will help materially to speed progress of the program.

**APFC Awards Iowa Club**

The Agronomy Club of Iowa State College at Ames has been named the best student agronomy organization of its kind in the United States and winner of a trophy and \$100 presented by the American Plant Food Council. The club received the National Agronomy Achievement Award for 1954 at the annual meeting of the American Society of Agronomy at St. Paul, Minnesota, early in November.

**New V-C Fertilizer Plant**

Virginia-Carolina Chemical Corp's new plant in Fernald, Ohio, for the production of phosphoric acids and sodium phosphates is now in full scale production. The plant will produce all grades of phosphoric acids and sodium tripolyphosphates and tetrasodium pyrophosphates in all granulations and specifications. The new facilities are under the supervision of Frank R. Keeshan, Jr., and assistant superintendent, Grayson G. Morrisette.

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*by S. F. Bailey and L. M. Smith*

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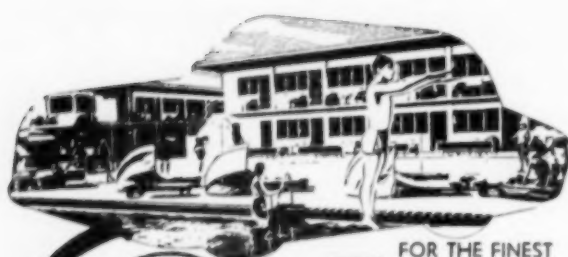
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1953

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## Tale Ends

IT was not at all surprising that some 600 showed up at last month's fall meeting of the National Fertilizer Association. Could it be that the locale . . . Hollywood, Florida, had anything to do with the ex-

cellent turnout? But apparently some one forgot to inform the local Chamber of Commerce, for the usual Florida sun was absent, and the only color acquired was the old favorite "nightclub tan".

H. J. Baker & Bro. sponsored a cocktail party which was one of the social highlights of the meeting. Complete with canapes, refreshments and entertainment.

AC

A buffet luncheon and fashion show, supposedly for the ladies, attracted as many men as ladies. The male interest in bathing suits, if not in the other fashions, was understandable. And we suppose the fashion show "triggered" the appearance of one of the new men's "short formals" at the banquet . . . white dinner jacket, Bermuda dress shorts and plaid cummerbund. The identity of this bold follower of what's new in men's dress will be protected in these columns.

AC

Bill Merritt of H. J. Baker returned recently from an African and European trip in the interest of the company's world-wide operations. Picking up a virus bug on the last lap of the trip, in Italy, he was forced to hurry his return somewhat. Prompt medical attention in the U.S., however, put him right back up on the fifty yard line, and strong enough to take off in mid-November for another trip—this time to Cuba—to complete his recuperation.

AC

The consumer magazines have been fairly alive recently with good features on various products in the ag chem field. Most recent is a 2-pg. article in *Life* telling about the use of rotenone to clear unwanted fish out of Woodland Lake, San Antonio, Texas. And the *New Yorker* back a few months ago came up with an excellent article on DDT.

AC

An innovation at the recent New York meeting of the eastern branch of the Entomological Society was the distribution by the speaker of data sheets in advance of several talks, taking the place of the usual lantern slides.

AC

There's now one less face, at least in the lindane and 2,4,5-T picture, as we get the news that a prominent manufacturer of these products as well as BHC has closed down its production facilities, and will keep them closed. It had to come, and this may not yet be the end. Once more it's the law of supply and demand,—which no one has yet been able to repeal. When there is more being produced than there is a market for, some one has to move to greener fields. And good luck to them.



## From Us to You...

GREETINGS and salutations! Christmas and the New Year are almost upon us once again. To our readers, our advertisers, our many friends all over the world, we want to extend in this our 9th year, heartiest holiday greetings, from

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### Hoppers - Grass, Leaf - Also Pose Insect Threat Here

Corn hoppers aren't the only insects threatening Wisconsin crops. Grasshoppers and leafhoppers also do serious damage. Shortly here destructive are grasshoppers.

The Illinois Natural History Survey in cooperation with the U. S. College of Agriculture has found that 50,000,000 grasshoppers are now in the state.

### Boll Weevil War About To Start, Checks Indicate

By BOB CHESNUTT  
Extension Service Editor

AUBURN — The annual battle in the old war against boll weevils seems about ready to start. At stake in the fight is some \$100 million — the average yearly toll taken by Alabama's pest.

### Horn Flies Can Be Controlled Easily

By WARE KENNEDY  
Assistant County Agent

Among the most annoying pests of this time of year are horn flies. They are small, but they are very annoying.

### Webworm Attacks Corn; Pests Prove Hazard to Crops

By Warren B. Anderson  
Associate County Agent

Webworm has small corn on over the past week. The insects that hide in its small silken web and feed on the leaves are tiny worms living in the silks.

### Worms Strip a Bean Field Overnight

About 10 Acres of Young Crop Stripped to Bare Earth; Worms on 'Hoppers, Too.

Watermelon, now adding to the trouble of farmers of this section, practically clean.

### Kill Those Hoppers, Missouri Urges

COLUMBIA, MO. — Grasshopper killing is starting in the southern portions of the state and over the entire state during the next several weeks.

**Good Morning!**

Day	Grade	Teacher	Subject	Time
Tuesday - February 10, 2015				
8:00	1st	Mr. Smith	Math	8:00-8:30
8:30	2nd	Ms. Jones	Reading	8:30-9:00
9:00	3rd	Mr. Brown	Science	9:00-9:30
9:30	4th	Ms. Davis	Math	9:30-10:00
10:00	5th	Mr. Wilson	Reading	10:00-10:30
10:30	6th	Ms. Miller	Science	10:30-11:00
11:00	7th	Mr. Taylor	Math	11:00-11:30
11:30	8th	Ms. Moore	Reading	11:30-12:00
12:00	9th	Mr. Clark	Science	12:00-12:30
12:30	10th	Ms. Lewis	Math	12:30-1:00
1:00	11th	Mr. Hall	Reading	1:00-1:30
1:30	12th	Ms. Young	Science	1:30-2:00
2:00	13th	Mr. King	Math	2:00-2:30
2:30	14th	Ms. Green	Reading	2:30-3:00
3:00	15th	Mr. White	Science	3:00-3:30
3:30	16th	Ms. Black	Math	3:30-4:00
4:00	17th	Mr. Gray	Reading	4:00-4:30
4:30	18th	Ms. Red	Science	4:30-5:00
5:00	19th	Mr. Blue	Math	5:00-5:30
5:30	20th	Ms. Purple	Reading	5:30-6:00
6:00	21st	Mr. Gold	Science	6:00-6:30
6:30	22nd	Ms. Silver	Math	6:30-7:00
7:00	23rd	Mr. Bronze	Reading	7:00-7:30
7:30	24th	Ms. Copper	Science	7:30-8:00
8:00	25th	Mr. Iron	Math	8:00-8:30
8:30	26th	Ms. Steel	Reading	8:30-9:00
9:00	27th	Mr. Lead	Science	9:00-9:30
9:30	28th	Ms. Zinc	Math	9:30-10:00
10:00	29th	Mr. Nickel	Reading	10:00-10:30
10:30	30th	Ms. Cobalt	Science	10:30-11:00
11:00	31st	Mr. Manganese	Math	11:00-11:30
11:30	32nd	Ms. Chromium	Reading	11:30-12:00
12:00	33rd	Mr. Vanadium	Science	12:00-12:30
12:30	34th	Ms. Niobium	Math	12:30-1:00
1:00	35th	Mr. Tantalum	Reading	1:00-1:30
1:30	36th	Ms. Tungsten	Science	1:30-2:00
2:00	37th	Mr. Rhenium	Math	2:00-2:30
2:30	38th	Ms. Osmium	Reading	2:30-3:00
3:00	39th	Mr. Iridium	Science	3:00-3:30
3:30	40th	Ms. Platinum	Math	3:30-4:00
4:00	41st	Mr. Gold	Reading	4:00-4:30
4:30	42nd	Ms. Silver	Science	4:30-5:00
5:00	43rd	Mr. Copper	Math	5:00-5:30
5:30	44th	Ms. Nickel	Reading	5:30-6:00
6:00	45th	Mr. Cobalt	Science	6:00-6:30
6:30	46th	Ms. Nickel	Math	6:30-7:00
7:00	47th	Mr. Nickel	Reading	7:00-7:30
7:30	48th	Ms. Nickel	Science	7:30-8:00
8:00	49th	Mr. Nickel	Math	8:00-8:30
8:30	50th	Ms. Nickel	Reading	8:30-9:00
9:00	51st	Mr. Nickel	Science	9:00-9:30
9:30	52nd	Ms. Nickel	Math	9:30-10:00
10:00	53rd	Mr. Nickel	Reading	10:00-10:30
10:30	54th	Ms. Nickel	Science	10:30-11:00
11:00	55th	Mr. Nickel	Math	11:00-11:30
11:30	56th	Ms. Nickel	Reading	11:30-12:00
12:00	57th	Mr. Nickel	Science	12:00-12:30
12:30	58th	Ms. Nickel	Math	12:30-1:00
1:00	59th	Mr. Nickel	Reading	1:00-1:30
1:30	60th	Ms. Nickel	Science	1:30-2:00
2:00	61st	Mr. Nickel	Math	2:00-2:30
2:30	62nd	Ms. Nickel	Reading	2:30-3:00
3:00	63rd	Mr. Nickel	Science	3:00-3:30
3:30	64th	Ms. Nickel	Math	3:30-4:00
4:00	65th	Mr. Nickel	Reading	4:00-4:30
4:30	66th	Ms. Nickel	Science	4:30-5:00
5:00	67th	Mr. Nickel	Math	5:00-5:30
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7:00	71st	Mr. Nickel	Reading	7:00-7:30
7:30	72nd	Ms. Nickel	Science	7:30-8:00
8:00	73rd	Mr. Nickel	Math	8:00-8:30
8:30	74th	Ms. Nickel	Reading	8:30-9:00
9:00	75th	Mr. Nickel	Science	9:00-9:30
9:30	76th	Ms. Nickel	Math	9:30-10:00
10:00	77th	Mr. Nickel	Reading	10:00-10:30
10:30	78th	Ms. Nickel	Science	10:30-11:00
11:00	79th	Mr. Nickel	Math	11:00-11:30
11:30	80th	Ms. Nickel	Reading	11:30-12:00
12:00	81st	Mr. Nickel	Science	12:00-12:30
12:30	82nd	Ms. Nickel	Math	12:30-1:00
1:00	83rd	Mr. Nickel	Reading	1:00-1:30
1:30	84th	Ms. Nickel	Science	1:30-2:00
2:00	85th	Mr. Nickel	Math	2:00-2:30
2:30	86th	Ms. Nickel	Reading	2:30-3:00
3:00	87th	Mr. Nickel	Science	3:00-3:30
3:30	88th	Ms. Nickel	Math	3:30-4:00
4:00	89th	Mr. Nickel	Reading	4:00-4:30
4:30	90th	Ms. Nickel	Science	4:30-5:00
5:00	91st	Mr. Nickel	Math	5:00-5:30
5:30	92nd	Ms. Nickel	Reading	5:30-6:00
6:00	93rd	Mr. Nickel	Science	6:00-6:30
6:30	94th	Ms. Nickel	Math	6:30-7:00
7:00	95th	Mr. Nickel	Reading	7:00-7:30
7:30	96th	Ms. Nickel	Science	7:30-8:00
8:00	97th	Mr. Nickel	Math	8:00-8:30
8:30	98th	Ms. Nickel	Reading	8:30-9:00
9:00	99th	Mr. Nickel	Science	9:00-9:30
9:30	100th	Ms. Nickel	Math	9:30-10:00